Farm Chemicals

FC

VOL. 12

57 sample tests per hour is our way of proving

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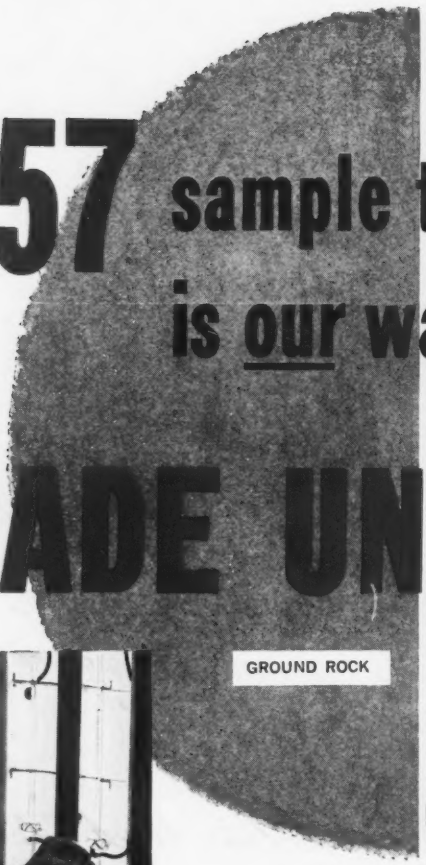

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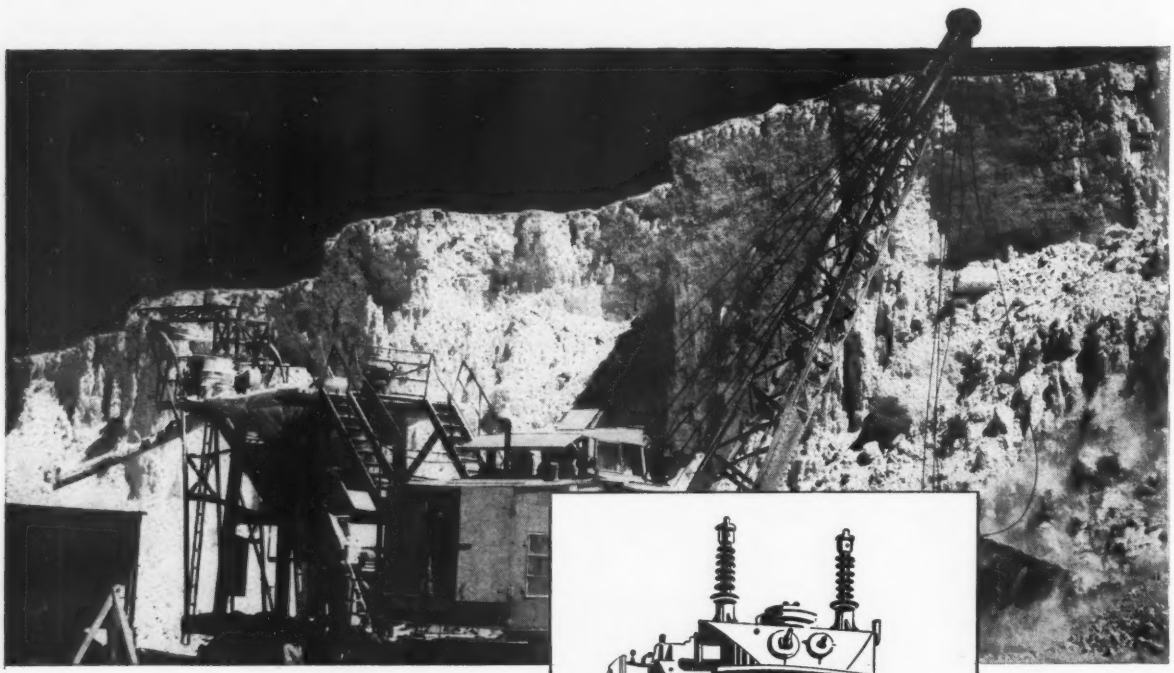
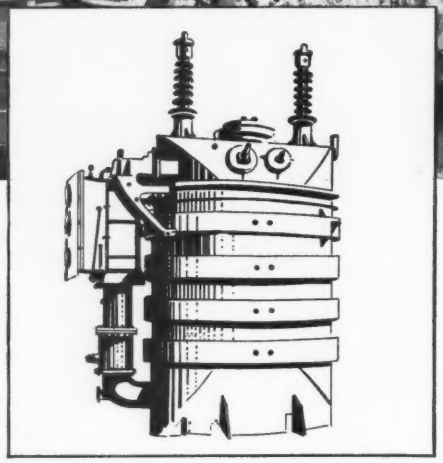
SULPHUR *helps to create Headline Products*





SF_6

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Farm Chemicals

Vol. 121 No. 3 March 1958

PIONEER JOURNAL OF THE INDUSTRY

FEATURES

INDUSTRY NEWS

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COVER PICTURE

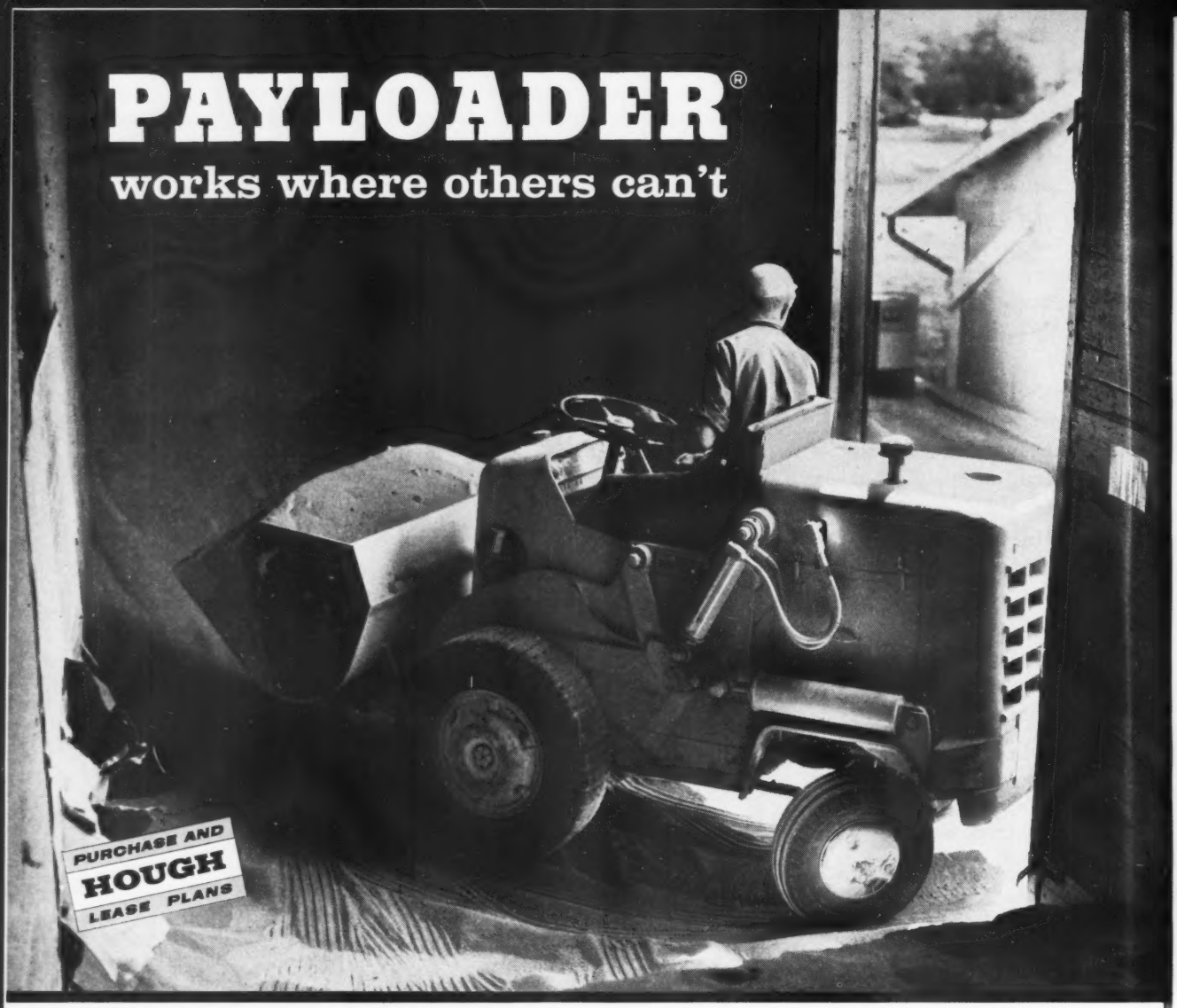
Scenes like this were enacted in every section of the United States last summer as nearly 2000 farmers were interviewed during a fertilizer consumer research study. Conducted for the National Plant Food Institute, the study has led to many developments, including the NPFI statement that farmers "now are using less than half as much fertilizer as research results indicate that they should for best economic returns." And the survey furnished the data for a constructed image of the "average American farmer." Three general characteristics: "Age—One half were 50 years old or older. Only 23 per cent were under 40 years of age. Education—54 per cent had only a grade school education or less. Only 9 per cent had attended college. Financial status—The average farmer is a substantial businessman. 65 per cent reported capital investments of $25,000 or more." Our report is on..... **page 14.**

A USDA Photograph

IN THIS ISSUE

PAYLOADER®

works where others can't



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VIEWING WASHINGTON

with Farm Chemicals Washington Bureau

on agriculture

The Soil Bank's Acreage Reserve program may be extended at least another year beyond 1958. This outlook reverses earlier indications that Congress would kill off the program at the end of this year. Under the Acreage Reserve, the Agriculture Department pays farmers substantial per-acre rates to retire for one year land which has been in cotton, wheat, corn, rice or tobacco.

Interest in the program has exceeded all expectations this year. Based primarily on a small winter wheat sign-up last fall, USDA officials and Congress figured the program was for all practical purposes a dead duck. But officials were completely taken by surprise when the $500-million program was over-subscribed on cotton and corn during the first two weeks of the two-month sign-up period.

As a result, Congress has ordered another $250 million added to the payment fund--making a total of $750 million to be spent for the 1958 crop year. This is the original amount requested by the USDA last year for the 1958 program, but Congress had cut it to $500 million.

This action in itself does not assure program continuation for another year--but, because of the tremendous interest evinced in major farm areas this year, congressional insiders don't see how they can cut off a popular program during an important election year.

A total of 18 million acres is being taken out of production this year through the Acreage Reserve. This is significant to the fertilizer and chemicals industry--for it means 18 million acres are taken out of farmers' buying plans. It means the industry will be selling to farmers having a smaller acreage base to care for. If continued indefinitely, reduced acreage could have considerable effects on sales.

Soil Bank's whole-farm bid program has been killed. Under this program, the USDA invited farmers in four states to set the per-acre annual rate they would accept to retire their whole farms in the long-range Conservation Reserve of the Soil Bank. The USDA had about $300 million to spend on such payments, but the bids were too high to make the program effective, so it decided to accept no bids.

The regular Conservation Reserve program, however, continues without disruption.

Spendable farm income this year will be about the same as during the past year--but your market is shifting. The trend toward fewer farmers--meaning fewer customers for the industry--continues. The USDA reports that, during the past year, close to 2 million people left rural areas --one of the largest numbers in recent years. These

VIEWING WASHINGTON

agriculture continued

weren't all farmers, but it helps show the shrinking number of customers for the farm chemicals industry.

The important thing is that the fewer farmers remaining represent a steady-to-higher market for fertilizer and chemicals, since they have essentially the same amount of land to operate. Furthermore, the remaining farmers more and more become science- and efficiency-minded--thus the farm market continues to provide an improving over-all market for this industry.

Congress is working on an omnibus farm bill which it thinks can be made acceptable to the White House--and, if not, then passed through Congress with the necessary 2/3-vote needed to over-ride a veto. That, at least, is the thinking of Chairman Ellender of the Senate Agriculture Committee.

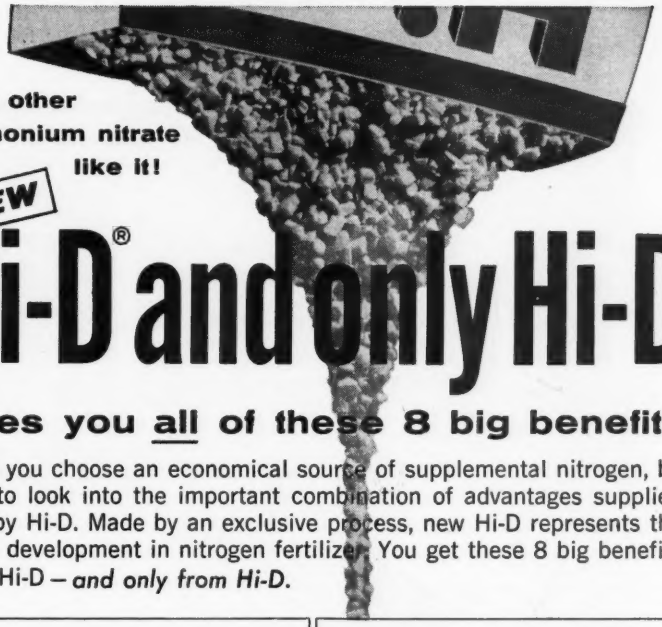
Key section of the omnibus bill concerns corn and the other feed grains. And the plan getting the closest scrutiny is one offered by the National Grange. The Grange plan would reduce acreage in corn and other feed grains--oats, barley and grain sorghums--by 20 per cent over a period of 3 years. Farmers would get conservation incentive payments and negotiable certificates drawn on government-held grain surpluses.

Besides aiming to withdraw roughly 28 million acres out of production, the plan also would remove incentives for continually striving for increased corn yields--which may form a threat to fertilizer sales.

The pressure for higher cotton allotments this year has let up somewhat because of the $250 million to be added to the Soil Bank's Acreage Reserve funds. The cotton industry has asked for both increased acreage allotments --to provide more production of better quality fiber-- and a bigger Soil Bank, to permit more cotton farmers to retire. USDA is opposed to an increase in allotments without a reduction in supports.

Growers of fire-cured and dark air-cured tobaccos have voted in a February referendum to continue marketing quotas on the next three crops--1958, 1959 and 1960. Quotas were approved by 95.9 per cent of the fire-cured growers voting, and by 96.5 per cent of the dark air-cured producers.

Secretary Benson will not obtain authority to "flex" tobacco price supports down to 60 per cent of parity. That's the unanimous decision of the tobacco sub-committee of the House Agriculture committee. This group, which originates tobacco legislation, voted without dissent this week to reject the proposal. This amounts to the first specific legislative action taken in Congress this year on the Eisenhower-Benson farm program. It is interpreted as an accurate reflection of the full committee's opposition to the overall Administration request for authority to drop basic supports to 60 per cent of parity.



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Note the magnified granule. The unique shape and size are controlled so that distribution is even and accurate in all types of spreading operations. And the flat-sided granules stay put on the ground.

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Hi-D flows freely even on hot sticky days. Because of its super dryness, high density, and special shape, Hi-D doesn't gum-up, doesn't stick, clog, cake or bridge.

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Hi-D supplies two types of nitrogen—*nitrate* nitrogen and *ammonia* nitrogen. Just one bag of Hi-D supplies as much nitrogen as 1½ bags of ammonium sulphate or 2 bags of sodium nitrate. And Hi-D costs less per unit of nitrogen than these older types.

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Hi-D supplies a total of 33.5% nitrogen in two equal "servings." 16.75% is *nitrate* nitrogen to get crops off to a fast vigorous start. 16.75% is *ammonia* nitrogen for follow-up feeding during the growing season.

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Because Hi-D has less bulk than any other type of ammonium nitrate, you get up to 25% more nitrogen in a normal hopper load—cover more ground per load. Hi-D saves storage space, too.

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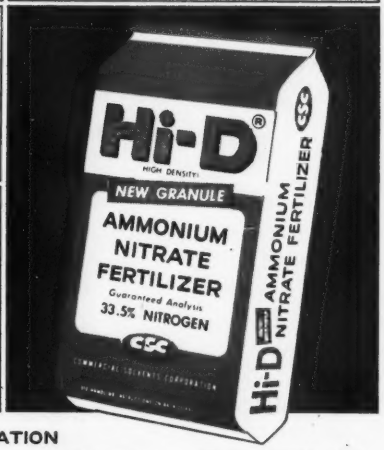

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Study shows "considerable market potential"

A LONG LOOK *at* FERTILIZER *and the*

THE National Plant Food Institute is seeking the solution to a problem: "to find ways and means of persuading farmers to use fertilizer at most profitable rates." To help solve the problem, NPFI now has answers to questions which are basic in any marketing situation.

National Analysts, Inc., a Philadelphia company that conducts a variety of marketing, psychological, social, and economic research, was employed by NPFI to conduct a study—through personal interviews—to discover scientifically farmers' attitudes toward the use of fertilizer.

The full report of the study, copyrighted and available to institute members, contains nearly 900 tables of data and a 150-page analytical summary.

The NPFI staff, in a 17 page analysis of the study, states that there are separate results for each of five regions—Northeast, Southeast, Southwest, Middle West and Far West—as well as for the United States as a whole. The conclusions in this FARM CHEMICALS report are from the analysis of the National summary.

"A representative sample of farmers (excluding share-croppers) was drawn from each of the four regions," says NPFI. "The sample was limited to farmers operating more than 100 acres of farm land. Although this resulted in eliminating 54 per cent of the total number of farms listed by the Census, the sample represents 92 per cent of total U. S. farm land. Moreover, it probably accounts for an even greater percentage of the farm market for fertilizer."

Market picture: "A considerable market potential for fertilizer is indicated by the results of this study," the staff reports. Here are some supporting figures:

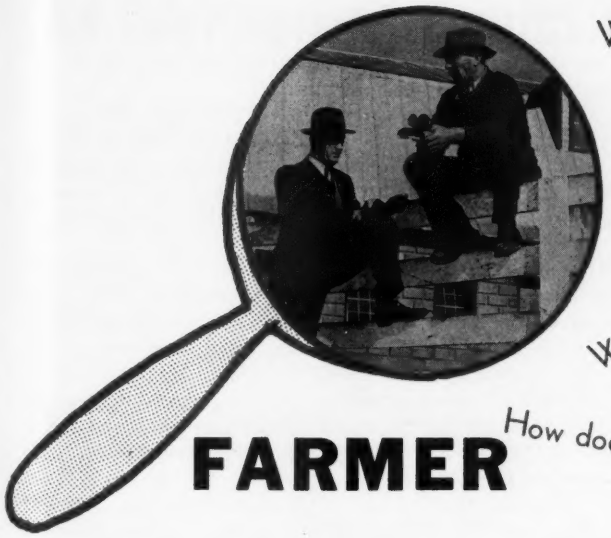
- Only 11 per cent of all farmers use fertilizer on either of their two most important crops at rates approaching those recommended by their state experiment station.
- 37 per cent of all farmers used no fertilizer on either their first or second most important crops.
- All other farmers interviewed (52 per cent) used fertilizer at rates much less than considered adequate for the type of crop and soil involved.
- Of all those using fertilizer on their most important crops, 50 per cent used less than 250 pounds per acre.
- Two-thirds of all farmers think it would be a "good idea" to fertilize pasture and forage crops and give positive reasons for their belief. Despite this favorable attitude, only 12 per cent of the acreage of these crops actually is fertilized.
- About 30 per cent of all farmers apparently change their fertilizer practices from year to year. NPFI staff's comment: "This demonstrates a positive effort on the part of these farmers to improve their fertilizer practices. These farmers should be particularly susceptible to being influenced favorably."
- Of those farmers who said they were making a change in their fertilizer practices in 1957, over twice as many said they intended to use more fertilizer as said they intended to use less.

Level of fertilizer use: After interviews were completed, each farmer in the sample was classified as to level of fertilizer use by specialists who were well acquainted with local farming conditions. Classifications were high, medium, low and none. High-level users were considered to be using fertilizer at rates approaching recommended levels. A farmer was classified as a "non-user" if he did not use fertilizer on the crop selected for detailed questioning (usually one of his two most important crops).

Characteristics of high-level users were found to be somewhat different from those of non-users. The high-level user has:

- More formal education—50 per cent had gone to high school and 14 per cent had attended college, compared with 34 per cent and 7 per cent of non-users.
- Higher income—74 per cent reported gross income of $5,000 or more as compared with 55 per cent of non-users.
- A bigger capital investment—71 per cent reported capital investments over $25,000 as compared with 63 per cent of non-users.
- He is younger—about 42 per cent were 50 years old or older compared with 54 per cent for non-users.
- He makes more money an acre—an average of $66 an acre gross income compared with $37 for non-users and the National average for all farmers of $46.

Attitude toward fertilizer: The staff reports that the farmer "is more likely to think of fertilizer in terms of increasing crop yields than as a means of cutting unit production costs and increasing profits. . . . Fear of adverse effects more often influences level of use than does the promise of economic



What does the customer think about fertilizer?

With whom does he discuss fertilizer problems?

What are his general traits?

FARMER

How does he decide on fertilizer kind and quantity?

reward. About half of all farmers mentioned bad effects when a rate of use approaching experiment station recommendations was suggested." (Waste of money and burning out of crop were the bad effects most frequently mentioned.)

He would prefer animal manure *if* unlimited amounts were available, the staff finds, adding, "*But*, a majority of high-level users prefer commercial fertilizer."

"*The average farmer's knowledge about fertilizer is surprisingly limited*," the staff says, adding, "the average farmer doesn't seem to understand clearly the meaning of analysis, grade or ratio." (Sixty per cent gave wrong or partially wrong answers when asked to choose grades which would correct specified plant food deficiencies.)

That first decision on kind and quantity: "About half of all farmers say they rely on their own judgment, trial and error, or recommendations of other farmers," NPFI reports, quickly adding, "but soil tests rate very high as the basis for decision, and there is considerable evidence that farm demonstrations exercise a strong influence."

Nearly half of all farmers and 59 per cent of fertilizer users reported having their soil tested.

While 71 per cent of high-level users said they followed soil test recommendations completely, 53 per cent of low-level users also said they did. "This information raises the possibility that many farmers only thought they were following recommendations, and indicates the desirability of a continuing review of soil test administrative procedures and methods of presenting recommendations," NPFI says.

"*The average farmer is more likely to believe results and adopt practices he can see and interpret in terms of his own farming operation*," NPFI says, pointing to the study finding that "practical farm demonstrations and personal experimentation seem to be more important in influencing low-level users and non-users . . ."

"Farmers need help in judging results from using fertilizer so that they can view fertilizer as a known factor in production," the staff says. "Otherwise they tend to attribute the benefits from fertilizer to other factors."

Seeking information and advice: In overcoming lack of knowledge and uncertainty with practical fertilizer information, the farmer rates county agents and agricultural college publications very high as sources, followed by farm magazines, local dealers, and neighbors.

Nearly 60 per cent of all farmers reported talking over fertilizer needs before buying. The study reveals that 82 per cent said the discussions were helpful, and 70 per cent said they led to specific action.

Analysis, amount and price—in that order—are the three topics discussed most, followed by expected results and advantages, brand, and application.

Plans for action: In describing its program suggested by the study results, NPFI comments on "the most significant findings" of the study:

- The average farmer's knowledge about fertilizer—as well as his general educational level—is much lower than previously had been suspected.
- Many farmers want to improve their fertilizer practices and a surprisingly large percentage of them constantly are making efforts to do so.
- Better educated farmers use more fertilizer.
- A large proportion of the educational and promotional information on fertilizer now beamed toward farmers is not clearly understood and cannot be related by them to their own operations.

NPFI believes that when a farmer "receives information about fertilizer which he understands and believes, he generally makes intelligent use of it."

The staff conclusions "point up the need for *better communications* with the farmers of today to sell, on a sound basis, more fertilizer now, and *more basic education* for both the farmers of today and the farmers of tomorrow to insure the future growth of the fertilizer market."

"Local adaptation and localized effort for maximum impact," says NPFI, "are the keynotes of the . . . specific action programs. Projects and activities are being developed regionally . . . to satisfy regional, state, and local needs." ▲

Dr. George M. Beal Dr. Joseph M. Bohlen

TWO rural sociologists of Iowa State College, Dr. Joe M. Bohlen and Dr. George M. Beal, reported on a study of the fertilizer dealer's role in a presentation at the joint meeting of midwestern college agronomists with fertilizer industry representatives. (See page 23.)

They said the dollar volume range of fertilizer departments of 12 dealers in the southeastern one-third of Iowa was from $5,000 to $38,000 a year, with an average of $18,500 gross sales in fertilizer. This amounted to a range of from 2 to 15 per cent, with an average of 6.6 per cent of their gross business volume from all departments.

Eighty per cent of the dealers surveyed said they offer soil sampling services to their customers; 90 per cent said they help farmers plan their fertilizer programs; 88 per cent offer bulk applicator services; 100 per cent offer credit facilities: and 73 per cent provide small dry fertilizer spreaders.

More than 42 per cent of the dealers said they would provide more fertilizer services if they could receive some help from outside sources such as the wholesaler or jobber of fertilizer.

When asked how important they thought the use of fertilizer was to the income and prestige of the farmer, 50 per cent of the dealers in the study said it was "very important;" 33 per cent thought it was "important;" and 8 per cent said fertilizer usage was "an absolute necessity."

When asked what was their best technique for selling fertilizer a wide variety of answers was received. Soil sampling and testing was mentioned by 24 per cent of the respondents, general services by 16 per cent and on-the-farm selling, 16 per cent. Other techniques mentioned as being most effective in selling fertilizer included helping farmers plan fertilizer program, credit, bulk spreading, free delivery, and hard selling methods.

Fertilizer dealers rank government agencies as the most important and reliable sources of information to their business. Commercial sources are a relatively close second, according to Bohlen and Beal.

Bohlen and Beal emphasized that "these findings are exploratory and tentative." But they concluded, "if additional research, using more precise measures and larger and wider area samples, support these findings, there seem to be many implications in the data for commercial concerns in product education and promotion." ▲

Safety Stressed At Monsanto's Anniston, Ala. Niran, Methyl Parathion Unit

Speed of construction: The new unit was completed in January, six months and 10 days after initial design work began last June. This was about one-half the time usually consumed in completing such a job, according to Catalytic Construction Co., hired by Monsanto for the project. The plant was on stream less than nine months after an explosion last April 16 took eight lives and destroyed the firm's Nitro, West Virginia, plant for the two organophosphorous insecticides. (Niran is Monsanto's trade name for parathion.)

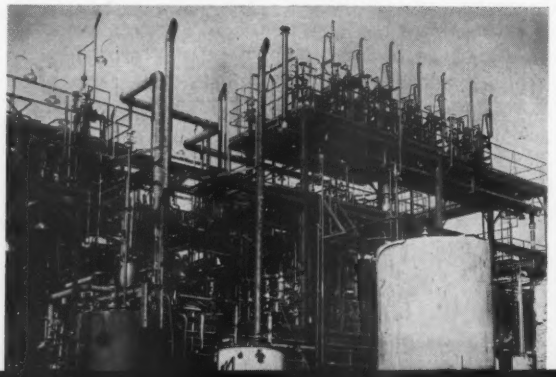
Maximum safety: Featured are multiple instrumentation (both electronic and pneumatic types) in the control room on each step of the production process, provisions for dumping reactor kettles into canals neutralized with caustic, an automatic system to cool the kettles with water, and cubicle-type construction. Reactor vessels are isolated behind 12-inch thick walls of steel-reinforced concrete block. All reactors are set up outdoors, to strengthen the defense against buildup of fumes (which, in the Nitro disaster, caused the deadly second explosion, a non-detonating flash type).

Location of the new facilities for Niran and methyl parathion at Anniston is reported to be based partly on the proximity to raw materials—notably chlorine and caustic.

Closeness of markets was also an important factor. The new site is "on the doorstep" of the cotton-growing south, according to Charles H. Sommer, Monsanto vice president and general manager of its organic chemicals division. (Phosphorous compounds have been used for boll weevil control in greatly increased amounts since 1956, when the U. S. Department of Agriculture confirmed reports from some areas of boll weevils' resistance to chlorinated hydrocarbon insecticides. See FARM CHEMICALS, Nov. '57, p. 45.)

Cost or capacity of the unit have not been revealed, but Sommer has said the capacity "considerably exceeds" the former output at Nitro.

Operating side of unit shown is separated from reactor side by a 12-inch-thick wall of steel-reinforced concrete blocks for maximum safety.



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RESISTANCE In Cattle Lice?

USDA tests with Hereford heifer calves show it's possible.

PESTICIDE researchers and manufacturers know that resistance and residues can team up on the pests' side of the conflict in any control program.

In the control of that profit-stealer of the range and feedlot—the long-nosed cattle louse (Linognathus vituli)—residues in the fat of treated cattle caused, in 1957, the discontinuance of DDT as a recommended treatment.

But infestations were still controlled by other insecticides, including the chlorinated hydrocarbon cousins of DDT, lindane and toxaphene.

A more recent development is the warning by entomologist Darrell Anthony of the U. S. Department of Agriculture that resistant strains of lice may be building up. Results of tests conducted by Anthony and co-workers at USDA's Agricultural Research Center, Beltsville, Md., indicate that two compounds—DDT and lindane—failed to provide complete protection against infestations of long-nosed cattle lice.

Early last summer, USDA bought for experimental use 24 Hereford heifer calves—approximately 3 to 4 months of age—from a cattleman in southwestern Virginia. Following usual procedure of handling newly-received animals, the calves were placed under quarantine in a disinfected barn and routinely examined for external parasites.

About half of the animals were lightly infested with long-nosed cattle lice and were subsequently sprayed with emulsions containing 0.025 per cent of lindane at the rate of 3 to 4 quarts per animal.

Researchers found no lice 1 week after treatment, but a second examination 11 days later revealed light infestations on 6 of the 16 calves still housed in the barn. They were given a second treatment, this time with spray emulsions containing 0.035 per cent of lindane, and again the 7-day examinations proved negative. However, six weeks later all but one were infested, and heavy lice populations were evident on 4 of the calves.

Already Treated

At the time of making their initial treatment for control of the lice, the entomologists assumed that the calves had not been treated previously. Later it was learned that the animals had received 2 treatments of 0.075 per cent lindane emulsion applied by a spray-dip machine. The first treatment had been made by the original owner late in March and the second approximately 2 weeks before the animals were shipped to Beltsville.

The fact that these two treatments by the owner and two additional treatments at Beltsville failed to eradicate the lice suggested the possibility of resistant strains. In view of the occurrence among other insects of resistance to various insecticides, entomologists routinely investigate any signs of possible resistance when insecticidal treatments fail to provide expected results.

Researchers undertook further studies in an effort to determine whether resistance had developed and to compare the effectiveness of several insecticides.

Twenty of the original 24 calves were used for additional trials. Results showed that sprays of 0.5 per cent of DDT and 0.075 per cent of lindane failed to give control beyond 7 to 14 days after treatment. Sprays of 0.5 per cent of malathion, however, gave complete control of lice for the entire 60 days the calves were available for observation. Malathion at this concentration has been recommended recently for louse control.

Tests Indicate Resistance

Laboratory tests were conducted by exposing lice from the Virginia cattle and lice from local cattle to filter paper discs treated with 5- and 25-milligram deposits of DDT. These tests showed that the Virginia lice were approximately twice as resistant to this insecticide. Further tests with 5-milligram deposits of lindane and 25-milligram deposits of malathion indicated that the two groups of lice were about equally susceptible to these insecticides.

While these experiments are believed to be the first to show possible resistance to insecticides in cattle lice, there have been reports from other sections of the country indicating increased difficulty in controlling these pests. Anthony emphasized that the results of current tests do not prove conclusively that cattle lice are becoming resistant to chlorinated hydrocarbon insecticides.

And there is so far no indication that any such resistance has become widespread among cattle lice. Approved materials are still recommended for general use. ▲

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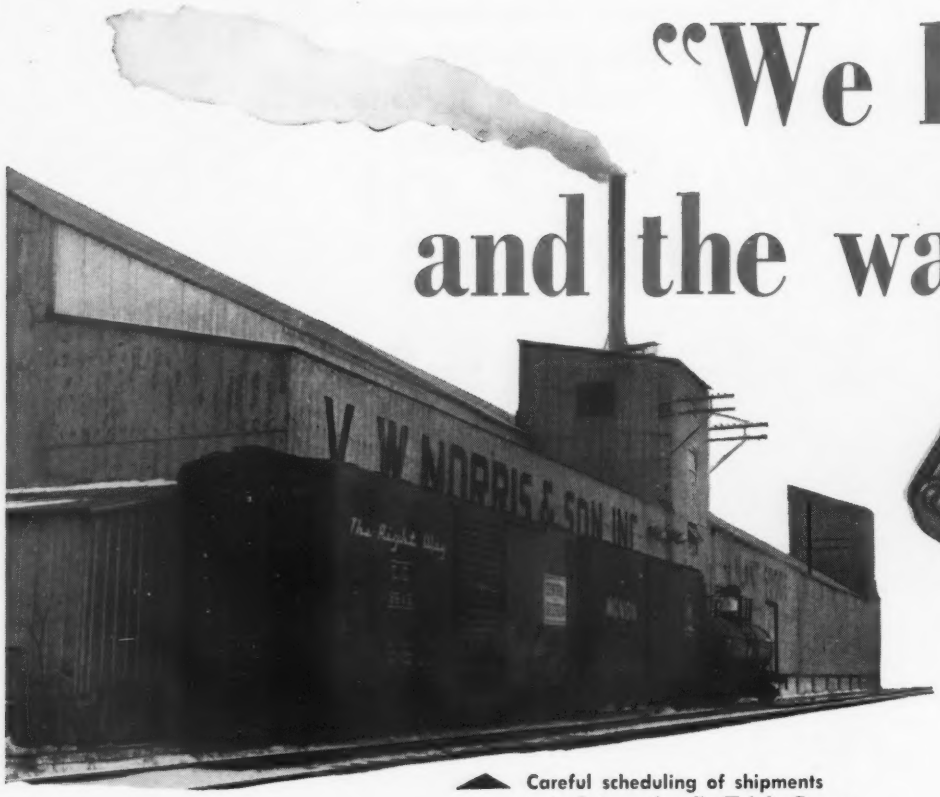

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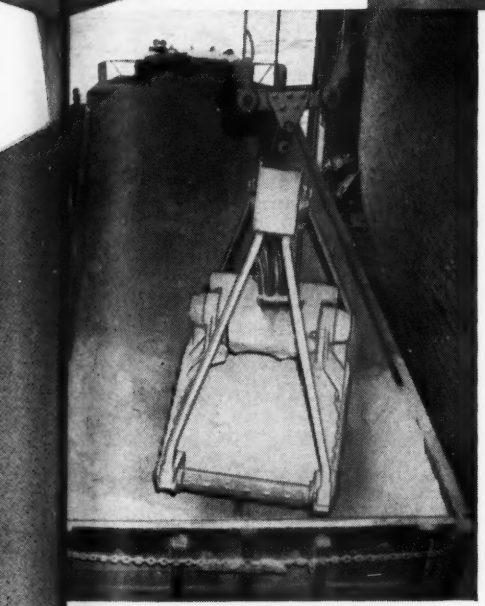

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NPFI sponsors tenth annual

Agronomy-Industry Joint Meeting

THE tenth annual joint meeting of midwestern agronomists and fertilizer industry representatives at the Edgewater Beach Hotel in Chicago February 13 and 14, was attended by more than 800 persons, including research and extension agronomists from 13 midwestern agricultural colleges and experiment stations.

Dr. A. J. Ohlrogge, associate professor of agronomy, Purdue University, was chairman of the meeting, which was sponsored by the National Plant Food Institute's Midwest regional branch (known as the Middle West Soil Improvement Committee until the January 1, 1958, merger with NPFI.)

Information from two presentations at the meeting, which were based on separate studies of attitudes toward fertilizer by National Analysts, Inc., for NPFI, and George M. Beal and Joe M. Bohlen, rural sociologists, Iowa State College, is on pages 14, 15 and 16, this issue.

Production potentials: Charles E. Trunkey, U. S. Industrial Chemicals, described a plan to help farmers realize the yield potential they have for their major crops. The "Production Potentials" program, he said, would give a farmer 1. specific information on cultural practices that can make his farming operation more profitable, and 2. equally effective information to convince him that a "better job is possible and desirable on his own farm."

The program is designed to combat the farmer's "belief that he is already getting all that's possible out of his soil," which Trunkey said is "one of the biggest reasons for the reluctance of a farmer to accept and put into use either new or already proven practices."

Midwestern agricultural colleges have been cooperating in the past two years in an effort to obtain data on reasonable crop production potentials for the various soil types by areas in their states, Trunkey said. The University of Illinois and the University of Wisconsin have produced such information, now being made available by the Midwest regional office of NPFI.

In these two states the production potential figures have been put on a 28 x 40 inch wall chart with soil area map, suitable for dealers' use. Also on the chart is a discussion of the importance of the potentials, some management instructions, soil water supply data and a list of nine factors essential to attaining the yield goals. A checklist for farmers, in leaflet form, supplements the chart, with more specific information and suggestions on these management points: 1. provide needed plant nutrients 2. use top quality seed 3. use recommended seeding rates 4. conserve soil and moisture 5. use minimum tillage 6. keep soil in good tilth 7. control weeds, insects and disease 8. harvest carefully to save crop 9. store to preserve quality.

Trunkey said the potentials reflect the yields a farmer could average throughout a complete weather cycle—one that includes the good and poor years.

Dr. W. H. Pierre, Iowa State College, chairman, North Central Soils Research Committee; Dr. W. P. Martin, University of Minnesota, chairman of Midwestern Agronomists; and C. A. Simkins, University of Minnesota, chairman of Midwest Extension Agronomists. The three were elected at the joint meeting.

Fertilizer economics: Soils specialists are finding that economic factors are becoming increasingly important in making recommendations for fertilizer use, according to Dr. John Pesek, Iowa State College agronomist.

Agronomists aim their recommendations at the maximum profit per acre for the farmer, Pesek said. He explained that they have arrived at upper and lower limits on fertilizer recommendations.

The upper limit, called the "optimum recommended rate" of fertilizer application, cannot be exceeded without reducing total profits from fertilizer use per acre. The lower limit is the "minimum recommended rate." A farmer cannot go below this rate

Shown at the recent executive committee meeting held in connection with the Midwest regional meeting of the National Plant Food Institute are **Back row:** Dr. Russell Coleman, executive vice president, NPFI; H. A. Parker, Sylacauga Fertilizer Co.; L. Dudley George, Richmond Guano Co.; Dean R. Gidney, U.S. Potash Co. Div., U.S. Borax & Chemical Corp.; E. J. Bock, representing John L. Christian, Monsanto Chemical Co.'s Inorganic Chemicals Div.; Paul T. Truitt, executive vice president of NPFI. **Seated:** Ralph B. Douglass, Smith-Douglass Co., Inc.; C. T. Prindeville, Swift & Co., chairman of the board of directors and executive committee; and John A. Miller, Price Chemical Co., NPFI president.

without decreasing the per cent of profits from his fertilizer dollar, as well as reducing the profits per acre.

If there is money available to fertilize at the optimum, this will lead to the highest profit for the farm.

If there is as much or more capital than is needed for the minimum recommended rate, but not enough for the optimum on all acres, profits are maximized by spreading at an equal rate over all acres (assuming an equal need for fertilizer).

If the farmer cannot afford to apply the minimum recommended rate to all acres, the minimum rate should be applied to as much land as possible and the rest left unfertilized, Pesek said. He emphasized that this scheme assumes that a crop can be produced at a profit without fertilizer, and suggested that if a crop cannot be produced profitably without fertilizer, one should plant no more than he can fertilize at the minimum recommended rate.

Wheel track planting: Dr. Arthur E. Peterson, University of Wisconsin soils specialist, reported that wheel track planting of corn (with which a field can be plowed and planted the same day) and the interseeding of alfalfa in corn, "promising new ideas," make it possible to reduce erosion and produce these crops more efficiently. He said that in practically all cases, yields of wheel-track planted corn have been equal to or higher than those grown with conventional seed bed preparation.

Peterson cited five advantages for planting corn with the new method: soil conservation, uniform corn germination, reduced planting time and costs, ease of weed control, and better use of sod cover and manure.

He said equipment is now available for drilling starter fertilizer at planting time. Spraying with pre-emergence weed killers, broadcast or over the wheel track, delays the first cultivation and "may entirely eliminate cultivation for weed control," Peterson said.

Fertilization systems: "Most of all the results of our fertility work indicate that there is no one best fertilizer program for field crops," reported Dr. H. J. Medereski, of the Ohio State University agronomy staff, in summarizing Ohio soil fertilizer research.

"In some tests," said Medereski, "we have compared fertilization systems in which a fixed amount of phosphate and potash fertilizer was applied over a five year period.

"In one case, only small amounts of starter phosphate and potash were used annually in combination with large amounts of bulk-spread nutrients.

"In the second case, the same total quantity of fertilizer was applied, but it was equally distributed among each crop each year.

"The results indicate that the total crop yields from the two systems of fertilization are essentially the same.

"We have also found the yield increase from row fertilization became smaller as the fertility level in soil increases. These and other studies indicate that we are able to build or increase the soil's fertility level to the extent that heavy row fertilization is unnecessary."

Single band placement: Farmers are being urged to shift as rapidly as possible from split-boot corn fertilizer attachments to single band placement equipment which puts the fertilizer to one side and below the seed, Dr. E. R. Duncan, Iowa State College extension agronomist said.

Dr. Duncan cited these reasons why efforts should be made to shift from the present attachments to improved types:

1. It would virtually eliminate present problems of injury in germination to seed.
2. It may make it possible to apply all needed fertilizer with the improved types of attachments, where soil tests indicate fairly adequate fertility levels.
3. More efficient use of commercial fertilizer can be expected, due to somewhat deeper placement.
4. Placement of the fertilizer is less variable and less dependent on soil conditions.
5. Improved equipment will make it possible to apply the most suitable fertilizer ratio for the crop, regardless of the soluble salt content.
6. Rates of application of fertilizer can be more accurate with improvements in the design of hoppers and delivery mechanisms.

"The points in favor of the single band method of placement to one side and below the seed," he said, "appear to easily outweigh the points against the method."

He reported that agronomists at all the state agricultural colleges contacted in the Corn Belt indicated that band fertilizer placement is equal to or superior to the split-boot attachments.

Corn irrigation: Yields as high as 150 bushels per acre have been obtained with irrigation on fertilized fields when a "very long season hybrid" corn variety was experimentally used, reported Dr. Floyd W. Smith, Kansas State College agronomist, who summarized soil fertility research in Kansas.

Irrigated corn fertilizer studies, Smith said, have revealed a number of problems, including the choice of proper corn plant populations per acre, the lengths of maturities of hybrids and the "time of occurrence of actual deficiencies in newly developed irrigation areas."

Water solubility of phosphorus in fertilizer has been studied in Kansas fields, greenhouses and laboratories since 1950, Smith said. He reported on observations that "phosphorous from concentrated superphosphate, ammonium phosphate, and ammoniated superphosphate has been of essentially equal availability to the small grains." He added, "results have been rather consistent from year to year."

Laboratory surveys have shown that most common materials have a minimum of 50 to 60 per cent of the phosphorous present in water soluble forms, Smith reported, but he added that there "appears to be no indication that this is a factor of major practical importance in Kansas."

However, Smith stated that "the influences of highly soluble phosphatic fertilizers upon the growth and normal maturity of corn sometimes have altered unfavorably its ability to produce a large yield." ▲

GUTHION . . .

Agrotors, Inc., Gettysburg, Pa., test sprays an apple orchard.
Photo: Carrol M. Voss

Apples injured by feeding of red-banded leaf roller larvae.
Photo: Ray R. Kriner

BY DEAN ASQUITH
Professor of Economic Entomology
Fruit Research Laboratory
The Pennsylvania State University

THE new insecticide Guthion may well serve as a lifesaver, temporarily at least, for the deciduous fruit growing industry in many sections of the United States. There have been few insecticides with such a broad spectrum of toxicity to insects and such a low degree of toxicity to deciduous fruit trees. Its introduction at a time when we are reading about strains of the codling moth resistant to DDT[1] and of strains of the red-banded leaf roller resistant to TDE[2] may prevent a reoccurrence of the disastrous condition in which the apple growing industry found itself before DDT rescued it from the destructive jaws of the codling moth just after World War II.

At the Eastern Branch Meeting of the Entomological Society of America in New York last fall, several entomologists presented data (not yet published) which showed conclusively that Guthion will be a valuable weapon for growers to use in combatting both the codling moth and the red-banded leaf roller. In one instance, Guthion gave better than 98 per cent control of the codling moth in an experiment in which standard applications of DDT resulted in only 64 per cent control of this pest.

An excellent practical characteristic of Guthion is that it may be used as the only insecticide for controlling the codling moth and the red-banded leaf roller on apple. Or, if the circumstances make continued use of DDT and TDE seem advisable, Guthion may be combined with these pesticides at reduced strength to increase the degree of protection obtainable with the older insecticides.

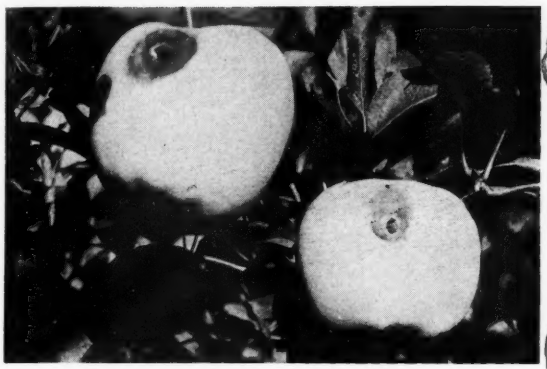
Protection Against Other Pests

Another point in Guthion's favor is that sprays of it applied to combat the codling moth and the red-banded leaf roller help prevent injury by such pests as the European red mite, the two-spotted mite and the green apple aphid. Although Guthion cannot be classified as a miticide with the effectiveness of Aramite or Kelthane, its employment in an apple spray schedule will reduce the number of special sprays for mites required druing the season. Also, the writer has observed no injury from the green apple aphid in apple orchards receiving regular treatments of Guthion.

In addition, Guthion may be used successfully to protect apples, peaches, plums and cherries from the troublesome plum curculio. It is also effective against the Oriental fruit moth.[3]

In 1957, the writer sprayed some apple, peach, cherry and pear trees using Guthion as the only insecticide throughout the season. These crops came through in excellent condition even though such

Lifesaver for Orchards



Close-up of apples injured by the codling moth.
Photo: George Van Horn

pests as the codling moth, red-banded leaf roller, green apple aphid, Oriental fruit moth, plum curculio, European red mite and two-spotted mite were present in the orchards. In another instance, the writer made observations in an apple orchard that was dusted with Guthion by helicopter three times during a critical period in the growing season. Although this trial was too limited to justify sweeping conclusions, the results were good enough to create optimism regarding this type of application for controlling pests of deciduous fruits with Guthion.

These experiences do not mean that Guthion may be used as an agent for "complete control" of all fruit pests, for there are many common pests of these crops that Guthion may not handle and which were not problems in the test orchards last year. On the other hand, these experiences illustrate the remarkable versatility of this pesticide and indicate that it may make feasible the simplification of fruit spray schedules in many sections of the country.

FDA Tolerance Established

The Food and Drug Administration of the U. S. Department of Health, Education and Welfare has already established a residue tolerance of two parts per million for Guthion on apples, peaches and pears. Labels should be read to learn the interval required between the last spray and harvest for each crop to be treated. On apples and pears, the interval required is 15 days.

Guthion, a development of Farbenfabriken Bayer, A. G., of Leverkusen, Western Germany, will be manufactured in this country by the Chemagro Corporation in its new Kansas City plant. Chemically, Guthion is O, O-Dimethyl S-(4-oxo-1, 2, 3-benzotriazinyl-3-methyl) phosphorodithioate. It is an organic phosphate insecticide in the general toxicity range of methyl parathion. This means that all the precautions advised for the handling of parathion and other insecticides in the organic phosphate group should be followed by handlers of Guthion.

The Future For Guthion

Undoubtedly, an insecticide such as Guthion will eventually find uses on many crops against a long list of pests. It has already given outstanding performance in control of the boll weevil on cotton.[4, 5] One might safely predict that entomologists working with Guthion will find that it can be used successfully as a control agent for several pests of field, ornamental and vegetable crops. ▲

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[1] *Hamilton, D. W. Resistance of the codling moth to DDT sprays. Jour. Econ. Ent. 49(6): 866–67. Dec. 1956.*
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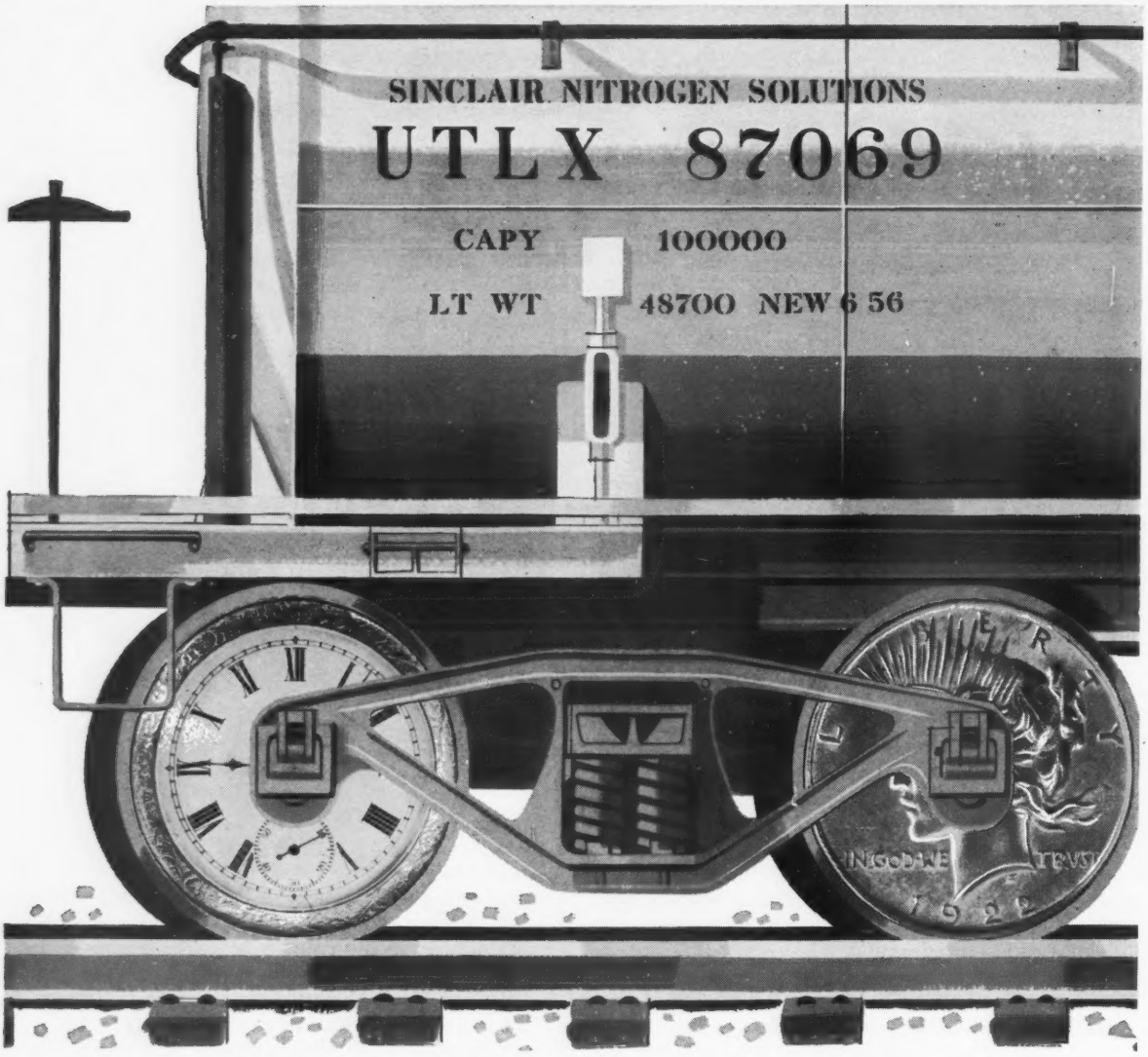

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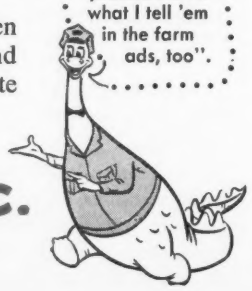

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Some General Principles in Ammoniation and Granulation

By RICHARD D. TAYLOE
Technical Service Director
National Potash Company

Modern fertilizer production is a highly complex chemical process. Recognition of the causes underlying the problems encountered is essential to successful operation. The complete process consists of two not very compatible sub-processes, ammoniation and granulation, which are combined by compromising the parts of each which interfere with the other. The operator should be aware of what he is trying to do, and how he is falling short of perfection in both ammoniation and granulation to achieve a practical economic compromise.

It is the author's purpose "to consider in detail the chemistry involved in not-too-technical language with the hope of clarifying some of the problems."

INTRODUCTION into the fertilizer industry of ammoniation, granulation and high analyses has transformed a materials handling industry into a full-fledged chemical process industry.

As originally developed, fertilizer manufacture, aside from the extremely complex reactions between rock phosphate and sulfuric acid, was a simple matter of more or less blending crude raw materials to make a low analysis fertilizer. It was soon recognized that certain materials were incompatible, that is, interactive. To get around this a curing period was introduced during which the pile slowly came to some sort of equilibrium, cooled and hardened. This initial cake was broken up and bagged. No further reaction and setting was supposed to occur—a fond hope not always realized.

Caking problems were aggravated when, some thirty years ago, the use of ammonia as NH_3 was begun. Some producers started shifting to a chemical process, as synthetic nitrogen carriers containing free ammonia became available at prices below those of packing house by-products and other organic wastes formerly used. Introduction of ammonia into the mixture was done for the most part by dissolving it first in a mixture of either urea and water or ammonium nitrate and water. A straight ammonia-water solution, also widely used, was probably the first commercial nitrogen solution. This was the now little used "B Liquor," 25 per cent total nitrogen, 30 per cent ammonia, 70 per cent water.

Solutions and Setting

The use of these solutions sharply reduced the cost of nitrogen, but a family of problems came with them. In the presence of the moisture introduced in the solution, the ammonia-calcium phosphate, ammonia-phosphoric acid and the various side reactions proceeded so fast as to generate enough heat to cause trouble if it were not removed quickly. Furthermore, with more moisture, more active nitrogen carriers and less organic materials, which were often excellent conditioners, reactions within the pile continued almost indefinitely and carried on into the fertilizer bag. Even if the mixture were dry enough as made, the hygroscopic nitrogen compounds picked up enough moisture to cause further reactions. Setting was an accepted fact of fertilizer storage for many years, until the advent of a newer technique brought promise of a partial remedy. This was granulation.

About the time ammoniation was getting started, the possibilities of making fertilizer into dried pellets, to prevent caking, were explored. It was found to work quite well in the case of straight superphosphate, and many thousands of tons were marketed as a dried dense pellet uniform in size, free of dust, and non-caking.

Granulation Leads to High Analyses

Experimental work was done on fertilizer mixes for over twenty years before granulation emerged as a workable process. Originally an approach to the prevention of caking by reduced surface contact and by reduced moisture, granulation was soon seized upon as a way by which higher analyses could be

made with enough success to warrant their production and marketing.

The solid with the highest nitrogen content in general use is urea, at 46 per cent N, followed by ammonium nitrate at about 33 per cent N. These are unusable in large amounts in fertilizer mixtures as solids, but the solutions containing them, with 40 to 50 per cent total N, can be used in large amounts if the mixture is then dried to a low moisture content.

Granulation, then, followed ammoniation to counteract the disadvantages ammoniation entails, and to permit its fuller exploitation. Two separate processes are involved, each with its own limitations and its own phenomena. From a practical standpoint they occur simultaneously, and they can be considered as one complex event. But first let's look at them separately.

Reactions in Ammoniation

Ammoniation, in fertilizer terminology, refers to the reaction of ammonia, NH_3, with the complex mixture that is superphosphate, either normal or concentrated or both mixed. Without writing chemical equations we can assume that the reacting materials are ammonia, phosphoric acid and calcium phosphate, both mono- and di-. In addition water is required and there is generally sulfuric acid present if granulation is included. In the mixture ammonium nitrate and potassium chloride also are reactive, more so in the presence of sulfuric acid.

Reaction products probably include calcium sulfate, tricalcium phosphate, ammonium sulfate, ammonium phosphate (again mono- and di-), ammonium chloride and potassium nitrate as well as other combinations. This depends, of course, upon the reaction mixture, the physical factors (thoroughness of mixing, intimacy of contact, ventilation, temperature), the nature of the reactants, and many other factors, some known, some unknown. Some sense can be made of this witches' brew by considering what we want to happen and what we don't want to happen. Then conditions can be adjusted accordingly. This, for the moment, without regard to granulation.

The primary objective of ammoniation, of course, is to get the ammonia into a stable combination as either ammonium sulfate or ammonium phosphate. To do this there must be intimate contact between the gaseous or liquid ammonia and the solid superphosphate and liquid sulfuric acid. Further, it is desirable to ammoniate all the superphosphate, as local over-ammoniation produces unstable ammonium compounds as well as unavailable tricalcium phosphate.

Acids and Corrosion

Complete neutralization of the sulfuric acid by ammonia is also desirable to forestall the acid attacking the ammonium nitrate and the potassium chloride. The first of these releases more free ammonia which must be reabsorbed or lost to the atmosphere, and both form other acids, nitric and hydrochloric. Each is more corrosive than sulfuric acid and in combination they are much more corrosive than either alone. Most of the corrosion of the mixer and spray pipes can be attributed to these acids.

The highly objectionable "plume" that plagues granulating plants is also the result of undesirable side reactions. On the other hand a desirable side reaction is the conversion of ammonium nitrate and potassium chloride to ammonium chloride and potassium nitrate. This reaction proceeds better without interference from the sulfuric acid.

Conditions that provide the best environment for the desired reactions are finely divided or porous superphosphate, a high liquid content in the mix, addition of the ammonia carrier and the acid at the same rate they are consumed, and thorough mixing in a fairly dense bed to provide intimate contact between the reactants. Correct formulation is an obvious necessity.

Granulation, however, is largely a physical matter. It involves agglomerating the materials into pellets of the desired size and reducing the moisture content to a level which will not permit the crystallization of salts by further drying or by alternate warming and cooling, as from day to night temperature changes in small storage piles or bags.

For Ideal Granulation

Ideal granular fertilizer is hard enough to endure handling without breakage, remains in a free-flowing condition indefinitely, and is uniform in analysis from manufacturing through handling to using. It should break down readily in the soil after use.

To obtain these results the mixture should be brought to chemical equilibrium before granulation. The use of hygroscopic materials should be avoided. The materials used should be fine relative to the size of the finished product. The product should be dried enough to prevent crystal growth and migration within, and particularly between, the granules during fairly wide temperature changes and a wide range of atmospheric humidities. The granule surface should be fairly smooth, to minimize intergranular contact and attrition.

While the actual granule size is of secondary importance in obtaining the desired characteristics, the farmer and his equipment are usually adjusted to something in the 4-to-20 mesh range. Therefore, we accept this range as a requirement.

The product should be sufficiently water soluble to provide disintegration of the granule in contact with soil moisture of 10 per cent or more. From both a physiological and a psychological standpoint it is good if, the granule has lost its physical identity after a few months' exposure to soil action.

In part these requirements are in harmony with the requirements of good ammoniation. The thoroughness of the mixing is helpful for both processes. *But most of the factors which help one hinder the other, and the combined operation represents a series of compromises.* For example, the wetter the mixture the more complete the reactions. From a chemical standpoint a thin slurry or even a solution would be best. But this would entail a heavy drying load and would be intolerable for granulation at the economic level on which most plants operate, and even the

plants which can handle slurries keep them thick and relatively high in solids. The moisture must be reduced to a very low level in the final product and the water input is generally controlled by the requirements of granulation rather than of ammoniation.

Ammonium Nitrate

An "assist" in increasing the liquid phase is obtained from the ammonium nitrate. This is a very hygroscopic material, as most of the nitrogen carriers are. Ammonium nitrate has the helpful property of melting at relatively low temperatures, particularly in the presence of moisture. Thus the use of some moisture plus ammonium nitrate plus heat results in a lot of liquid in the mixer. This solidifies readily on cooling and only the water must be removed from the mixture. For this reason ammonium nitrate is very helpful in producing granulation, enough so that its drawback as a moisture-absorber is generally tolerated.

Its adverse effect can be reduced by distributing it throughout the granule rather than leaving it on the surface, and by drying the product to a very low level. Both of these reduce the tendency of the ammonium nitrate to dissolve with rising temperature and to recrystallize with drying or cooling. Better distribution of the ammonium nitrate is obtained by the use of finer solid raw materials and by thorough mixing. Both are desirable for many reasons in the ammoniation-granulation process. There are some practical considerations to be taken into account in going after the optimum particle size and the optimum mixing. The two are interrelated and must be considered together.

In sizing the materials before mixing, the screenability of the superphosphate is generally the controlling factor. Because of its soft gummy nature the efficiency of screening falls off rapidly as the screen opening is reduced. Since all of the material must go through the screen in a reasonable time and since the screen must continue to run for a reasonable time without blinding, an opening must be chosen which represents a compromise between the large size desirable for screening, and the small size desirable for ammoniation.

Coarse Potash

An additional factor in screening is the use of coarse potash to aid granulation in rotary drum or TVA process plants. It is the author's opinion that this is effective as offsetting poor mixing; pug mill plants with their better mixing do not require the coarse potash for successful granulation. The coarse potash currently available is in general all minus 8 mesh in size. This puts the feed screen at something larger to avoid grinding the potash. Screens in use vary from four mesh to about six mesh, a specification dictated by production rate (getting the superphosphate through the screen without delay) and by granulation efficiency (the use of coarse potash or other materials) rather than by the need for a fine material for better mixing.

Mixing obtained in the usual rotary mixer is not very good since thorough mixing requires the input of power. A fair-sized pug mill may have 100 horsepower or more driving the paddles whereas the rotary drum ammoniator has perhaps 20 horsepower. Obviously material cannot be worked, churned and mixed as thoroughly in such a mixer as in the pug mill.

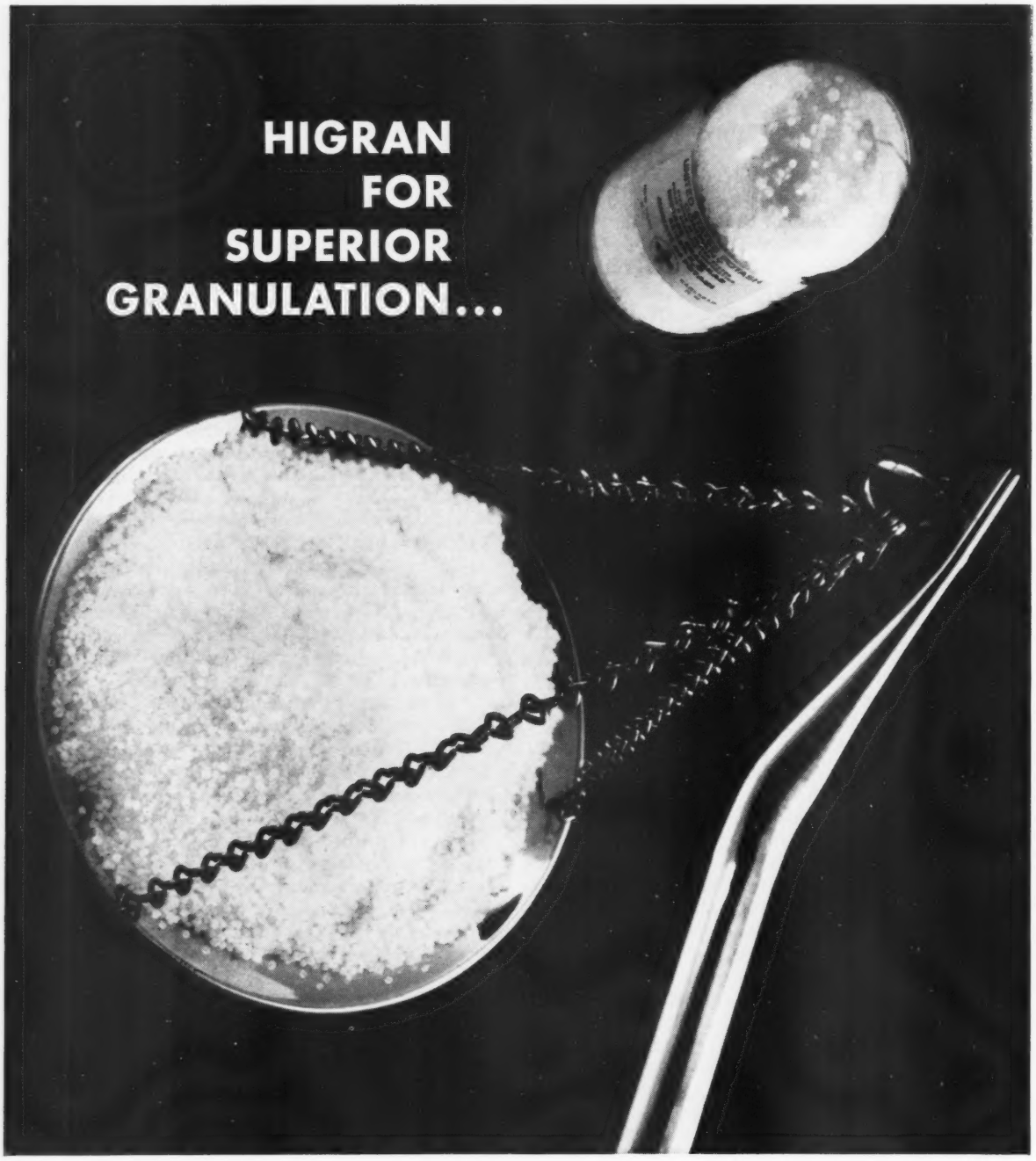
This is confirmed by the fact that pug mill plants are able to use materials of a fineness which rotary drum plants find intolerable. The principal offender in this regard is potash. The two reasons for this are (*1*) the low solubility and non-adhesive nature of potash and (*2*) the large amount of potash used. The English granulators, who use large amounts of ammonium sulfate, report that it has the same effect. Sulfate is not a problem in this country because the amount per ton is usually quite small.

The potash particle must be wet and brought into close contact with the superphosphate and the ammonium nitrate in order to get it to enter and stay in the product granule. It apparently requires some effort to do this, and uncoated potash in the product is fairly common. This wetting is a surface action and the more surface there is the more effort is required to get it coated. With the fine potash the surface area is large, resulting in a lot of unagglomerated potash falling below the minimum product size. This causes a lot of recycle rich in potash which must be reworked and finally built into granules.

The manufacturer has found that the simplest way to get out of this difficulty is by the use of potash falling largely in the final product range, or at least the lower part of it. This greatly reduces the total surface area in a given weight of potash, which means that less plastic material is required to incorporate the potash into granules. In addition, since the potash is in the product size range, it is screened into the product stream rather than recycling even if it is not combined with other materials at all. Thus the recycle stream is greatly reduced.

This greatly improves granulation efficiency and from that standpoint is a valid measure. By the use of coarse potash, however, the desirable reaction between the potash and ammonium nitrate is certainly hindered and just as certainly the homogeneity of the product is reduced. These are matters of degree and a judicious use of coarse materials as an aid to granulation cannot be criticized. The manufacturer should be aware of the compromise he is making and should keep it under control so that his product is the best possible from an overall consideration. He should not sacrifice equally desirable but less obvious qualities for one more readily apparent.

As a practical matter the operator pushes his rate of production as high as he can, putting up with the loss of ammonia. He offsets the insufficient mixing by using coarse materials. He accepts the hygroscopicity of ammonium nitrate to get its high nitrogen content and its low melting point. If successful, his entire operation is a skillful balancing of product quality against product cost. Considering the simplicity of the equipment and the complexity of the process, the industry record, in general, is excellent. ▲



USP'S SPECIALLY SIZED HIGRADE GRANULAR

USP's new Higran—a white granular muriate of potash specially sized for the manufacture of modern fertilizers. Non-caking and free-flowing throughout, Higran is the *purest* agricultural granular muriate of potash now available (62/63% K_2O).

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USP also offers Higrade muriate of potash—62/63% K_2O—and Granular muriate of potash—60% K_2O—both free-flowing and non-caking.

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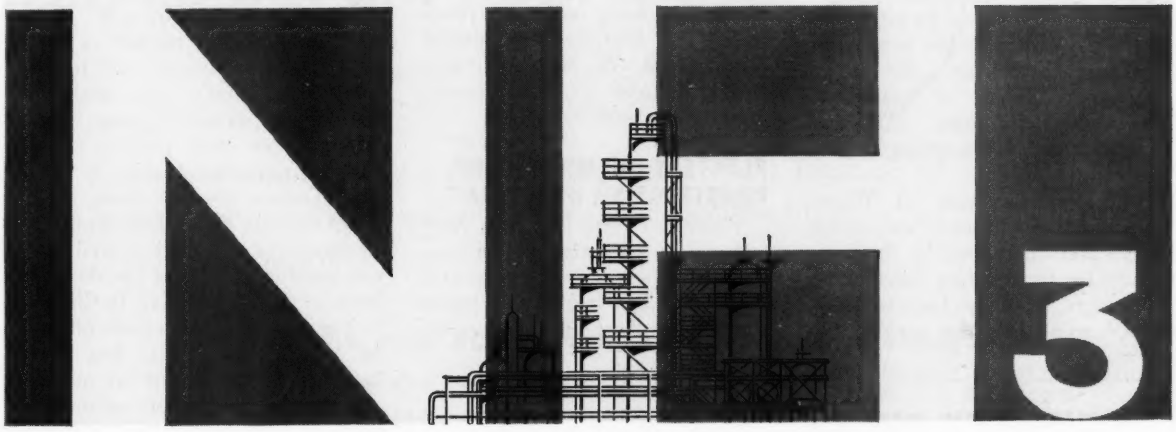

TEXACO'S LOCKPORT (ILL.) AMMONIA PLANT

If you use anhydrous ammonia, aqua ammonia or nitrogen solutions, here are some of the important advantages you get when you order from Texaco-Lockport:

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TEXACO

PETROCHEMICALS

DIAMOND ALKALI SELLS BLACK LEAF UNIT

Diamond Alkali Co. has sold its house and garden line of insecticides and lawn chemicals of Diamond Leaf Products, a unit of the firm, to a newly-formed Illinois corporation. The new concern, Black Leaf Products Co., organized by a group headed by A. K. Paul and presently establishing operations in the Chicago area, has purchased Diamond Black Leaf's house and garden line inventory and assets, including raw materials, formulated products, packaging and promotion materials, and the Black Leaf trademark and tradename. Pending establishment of its manufacturing operations, the new company plans to lease a portion of Diamond's plant at Louisville, Kentucky, to meet marketing requirements of the spring buying season.

Diamond's plants at Waco, Texas and Richmond, Va., which were previously used by the company for formulating Black Leaf products, have also been sold.

Diamond has also notified the government that on April 27 it will terminate its lease for the operation of the chlorine—caustic soda plant at the Pine Bluff Arsenal, Pine Bluff, Ark., in accordance with the terms of the lease.

MERCK REORGANIZES CHEMICAL DIVISION

Merck & Co., Inc., has announced that it has reorganized the sales and marketing area of its chemical division into four separately functioning departments.

Each department will operate in specialized areas under the supervision of a marketing director. Appointed as directors are: H. P. Sarkison, medicinal products; J. E. McCabe, agricultural products; R. W. Hayes, general products; and G. C. Moore, distributive products.

PLANTERS CHEMICAL CORP. CONSTRUCTING NEW PLANT

Planters Chemical Corp., Norfolk, Va., currently celebrating its 50th year in agricultural chemicals, has begun operations for a new plant at Fayetteville, N. Carolina. Completion of the plant is expected by April. Consisting of a brick building 50 feet by 200 feet, the plant will be used for the blending of finished dusts.

Baynard E. Swayne will be in charge of the operation.

STEPAN MAKES LARGEST EMULSIFIER SHIPMENT

Stepan Chemical Co., Chicago, has reported sending the largest single shipment of agricultural emulsifier on record—12 railway tank cars—to the Stauffer Chemical Co.'s Tampa, Fla. plant.

The emulsifier is being used to formulate 20 million pounds of Toxaphene liquid spray, which Stauffer is supplying on contract to the Egyptian government.

NEW FERTILIZER PLANT IN FULL OPERATION

Coastal Chemical Corp's new 6½ million dollar plant on the Bayou Casotte Harbor at Pascagoula, Miss., is in full operation. Facilities include a sulfuric acid plant which will produce 60° and 66° Be acid for the market as well as 98 per cent sulfuric acid to be used in Coastal's high analysis ammonium phosphate plant. The latter plant will produce wet process phosphoric acid in the Saint Gobain reactor system. The Saint Gobain Co., Paris, France, designed the plant. The facilities can produce 350 tons per day of high analysis granular fertilizer.

The company, with main offices in Yazoo City, Miss., has also begun construction of an oleum plant and an anhydrous ammonia plant.

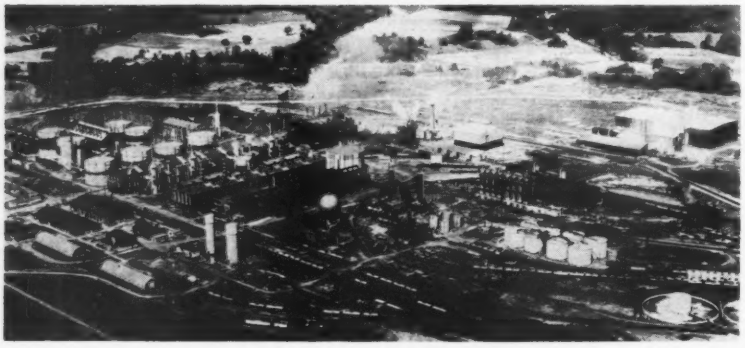
NEW DISTRIBUTION POINT FOR DIMETHYLAMINE

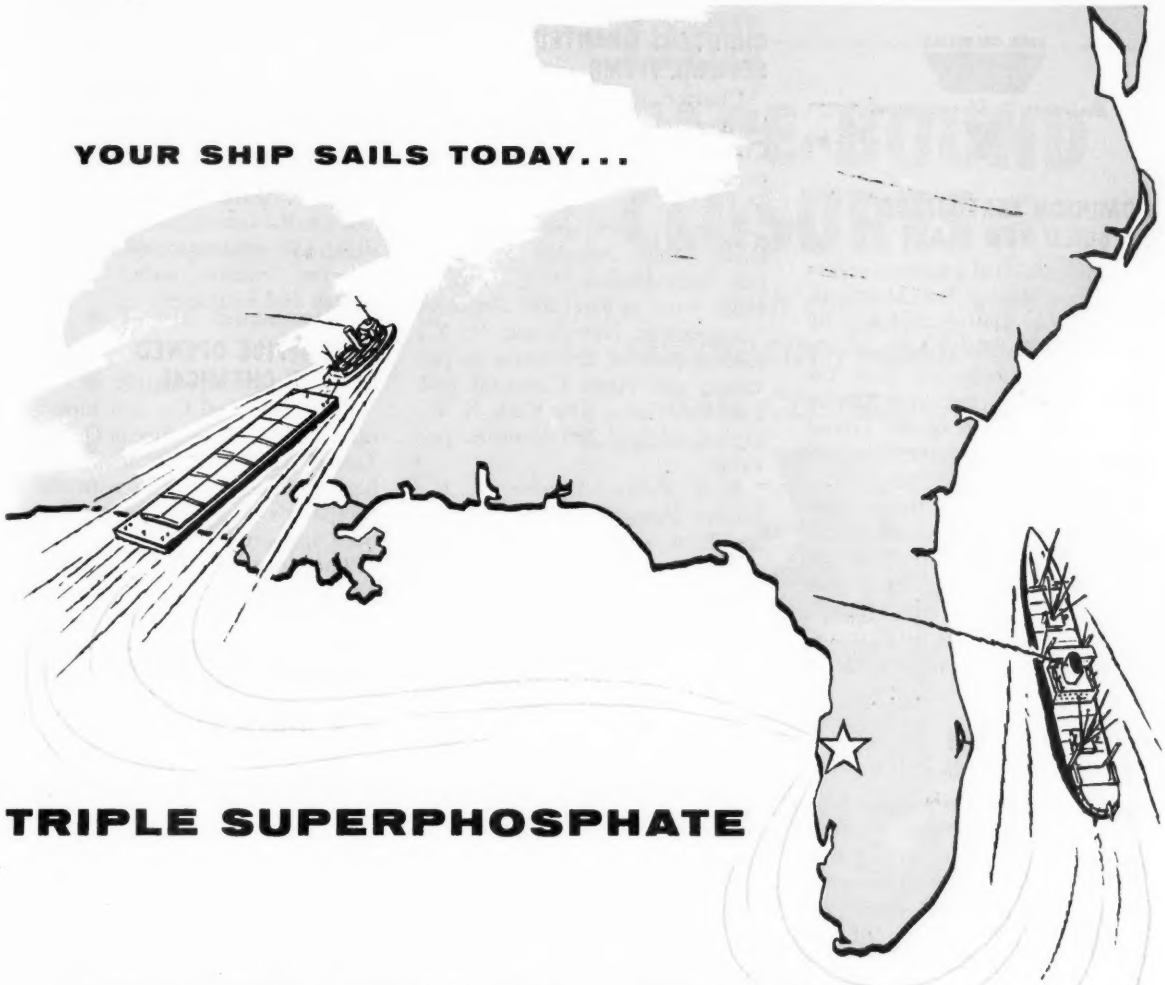
Du Pont's Grasselli Chemicals Dept. has added dimethylamine dilution facilities to its Cleveland, Ohio, plant. Shipments of the product in aqueous solution are being made from that point in tank truck or tank car lots.

Dimethylamine is used in the synthesis of organic products important to both agriculture and industry. Agriculture products include fungicides, herbicides, and insecticides.

NITROGEN DIV. REVAMPS OHIO PLANT

An aerial view of the South Point, Ohio, plant of Allied Chemical & Dye Corp.'s Nitrogen Division which is currently being revamped. Additions will boost its urea capacity from 80,000 to 110,000 tons a year and increase the Division's total urea capacity to 220,000 tons yearly, making it the largest in the field.





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FARM CHEMICALS

Business & Management

DOMINION FERTILIZERS TO BUILD NEW PLANT

Construction of a modern superphosphate plant at Port Maitland, Ontario, has been undertaken by Dominion Fertilizers Ltd., a new firm. It is expected that the plant, to be erected on a 22 acre site at the mouth of the Grand River leading into Lake Erie, will be completed by early summer.

According to Erol Baker, general manager, the capacity of the plant will be sufficiently high not only to take care of quantities presently imported into Canada, but also to supply Canada's future needs for its ever growing use of the product.

OIL FIRM ENTERS FERTILIZER FIELD

Hydrocarbon Chemicals, Inc., an oil producing and pipeline concern, last month acquired 90 per cent of the outstanding stock of the Calunite Corp. Under the terms of the sale voted by the Calunite stockholders, the corporation will be expanded and strengthened to continue production of the fertilizer bearing its name.

Paul N. Belmont, president of Hydrocarbon, announced that Albert B. Diss, formerly a vice president of H. K. Porter, Inc., was elected president.

Calunite mines the mineral alunite in Marysvale, Utah, and manufactures its own Calunite fertilizer in Pomona, Calif.

FERTILIZER PLANT BOUGHT BY MAJOR STOCKHOLDERS

Mr. and Mrs. Louis Head, Troy, Ala., two major stockholders in the Standard Chemical Co., one of the oldest fertilizer firms in the South, purchased the firm at auction for $124,760. The plant has been closed since last April. When operating at full strength, the company had employed as many as 300 workers and produced 20,000 tons of fertilizer annually.

CHARTERS GRANTED SEVERAL FIRMS

Charter of incorporation has been granted to Tupelo Processing Co., Inc., Tupelo, Miss., fertilizer concern. Capital stock was listed at $25,000.

Charters were also granted to these firms: Ahoskie Fertilizer Co., Inc., Ahoskie, N. C., capital stock listed at $100,000; Organite Corporation, New York, N. Y., capital stock of 200 shares no par value; and Axon Chemical and Fertilizer Corp., New York, N. Y., capital stock of 200 shares no par value.

S. S. Pierce, Ahoskie, N. C.; Luther Powell, Windsor, N. C., and P. A. Lewis, Jackson, N. C., were the incorporators of the North Carolina firm. Marshall MacDuffie, New York City, filed the papers of the Organite concern and is listed as one of the directors. Other directors are Stephen Varro, Jr., Rego Park, N. Y., and Lawrence M. Craner, Forest Hills, N. Y.

The Prentice Hall Corporation System, Inc., New York city filed for the Axon firm. Michael Patestides, Yorkston W. Grist and John G. Poles, all of New York City, are listed as directors.

NEW AMMONIA PLANT

The California Ammonia Co., a new company, last month broke ground for a new $4,800,000 ammonia plant.

A group of 550 central California farmers and agriculturists have banded together in cooperation with Best Fertilizers Co. to organize the company and provide financing for the project.

The new plant is designed to provide a constant production of 100 tons of anhydrous ammonia per day.

DIAMOND ALKALI REALIGNES SALES AND SERVICE DEPTS.

Frank Chrencik, general manager of Diamond Alkali's Electro Chemicals Div., announced a realignment of responsibilities in the division's sales and technical service activities.

Lloyd R. McCoy, who has headed the division's technical service section at Painesville since mid-1956, returns to the company's national headquarters at Cleveland as assistant to the manager of chlorine and hydrogen sales. Named to succeed him at Painesville is Wayne Inbody, group leader in caustic soda and chlorine research for the past year and a half. Inbody will be responsible for customer service on chlorine, caustic soda, caustic potash and hydrogen.

NEW OFFICE OPENED BY DOW CHEMICAL

Dow Chemical Co. last month opened a new sales office in Dallas, Texas. Donald P. Camp, former head of chemical sales with the company's Houston office, has been appointed manager.

The office, the 18th in principal cities throughout the country, will handle all Dow Product lines, industrial and agricultural chemicals, and plastics and magnesium.

NEW CORPORATION

The announcement of the incorporation, under the laws of Texas, of Smith Co. of Ulvade, Texas, has been made by S. C. Smith, president. The new titled business is made up of The Smith Co., a partnership formed in 1948; The Smith Co.—Pearsall Div., a partnership; and Giles Chemical and Fertilizer Co., Inc. of San Antonio, a Texas corporation.

WOODBURY CHEMICAL CO. EXPANDS FACILITIES

Herbert A. Woodbury, president of the Woodbury Chemical Co., has announced the opening of new insecticide facilities in Goulds, Fla. Richard K. Hutchings is in charge of operations.

The company's export division, under the direction of Joseph L. Flores, will also utilize the Florida facilities to supply the company's Latin American markets.

Woodbury also announced that its western division in Denver, Colo., has consolidated its expanded production and warehousing facilities with the purchase of the Brancucci Co. chemical plants in Denver. The division was established in 1956 with the purchase of the Export Chemical Corp., of Colorado. It is under the management of Leonard R. Everett.

Chemicals

53—NEW GRANULAR TRIPLE SUPER

International Minerals & Chemical Corp. says its new granulated triple super is non-crumbling, free flowing . . . and it ammoniates. Each granule has a unique sponge-like structure reported to facilitate ammoniation and contribute to desirable granular texture in mixed goods. It's packed with customer-pleasing qualities for direct application, too, according to IMC; the granules won't bridge over in a fertilizer drill or crumble during handling or spreading. For full information

CIRCLE 53 ON SERVICE CARD

54—ESPESOL 1

A free booklet on the characteristics and properties of insecticide solvents is available from Eastern States Petroleum & Chemical Corp. Where high flash is desirable, the company says its Espesol 1 is an ideal diluent. Tested and approved by government and college experiment and extension facilities, Espesol 1 is non-phytotoxic and offers a fast evaporation rate because of its narrow boiling range, reports ESPECO. For a copy of the booklet giving complete information

CIRCLE 54 ON SERVICE CARD

55—TRONA PRODUCTS

A complete 12-page products catalog and informational booklet has been issued by American Potash & Chemical Corp. Included are descriptions, properties and applications of nearly 70 chemicals marketed under the company's Trona trademark. If you'd like a copy,

CIRCLE 55 ON SERVICE CARD

56—TABUTREX BULLETIN

A four-page bulletin from Glenn Chemical Co. may answer many of your questions on Tabutrex insect repellent. Its advantages, physical characteristics, results of toxicity and milk residue tests and registration status are all presented in the brochure. A copy will be sent to you if you

CIRCLE 56 ON SERVICE CARD

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Reader Service

57—VERSENOL IRON CHELATE

Put new growing power right in your liquid or dry fertilizer with Versenol Iron Chelate, a product of Dow Chemical Company. To get latest literature and complete information, just

CIRCLE 57 ON SERVICE CARD

58—N SOLUTIONS IN FERTILIZERS

A technical booklet on nitrogen solutions for fertilizer manufacture has been published for the fertilizer industry by Sohio Chemical Co.

Designed for day-to-day use in plant operations, the booklet contains a 16-page section on manufacturing with nitrogen solutions, plus basic information on various N solutions.

A section discussing fertilizer manufacture provides information in selecting solutions, along with a review of such topics as: Uniformity of ammoniation and absorption, reversion, temperature, alkalinity and acidity, hygroscopicity and solubility, and the use of urea and other specific materials.

Other sections discuss granulation versus conventional mixing, considerations and calculations in formulation, and plant and personnel safety. Product information sheets on aqua and anhydrous ammonia as well as nitrogen solutions are also included.

For a free copy, fertilizer manufacturers may

CIRCLE 58 ON SERVICE CARD

59—TERRACLOR FOR PEANUTS

The use of Terraclor as a soil fungicide for Southern Blight in peanuts is described in a new bulletin from Olin Mathieson Chemical Corp. Illustrations compare Terraclor treated rows of plants with untreated rows. A dosage rate chart gives application rates of the chemical when used as a surface band treatment, preplant soil mix and as a soil mix during cultivation. A copy is yours if you

CIRCLE 59 ON SERVICE CARD

60—MICRO-CEL

You can formulate high concentrate wettable powders at low cost with Micro-Cel, reports Johns-Manville. The company says its Micro-Cel is a new absorbent grinding aid designed specifically for the insecticide formulator. Among the advantages listed for the product are its extremely high absorptive properties and free-flowing qualities. For further data,

CIRCLE 60 ON SERVICE CARD

Process Equipt.

61—MAGNETIC FLOWMETERS

Principle and operation of magnetic flowmeters are discussed in a new Fischer & Porter catalog. The company says its new flowmeter accurately measures the flow rate of "difficult" liquids such as acids and slurries without adverse effects to the meter.

For a copy of the catalog giving advantages and specifications of the F&P unit,

CIRCLE 61 ON SERVICE CARD

62—MICRONIZER BULLETIN

Fluid energy grinding is described and typical grinding data for various materials is given in a new technical bulletin on the Micronizer offered by Sturtevant Mill Co. Also included is a cross-section drawing of the Micronizer and a flow sheet of a complete fluid energy grinding unit. Sizes, pressure requirements and capacities are tabulated. Information is also given on how to obtain custom or experimental fine grinding service from Sturtevant. For a copy,

CIRCLE 62 ON SERVICE CARD

63—CONICAL DRYER-BLENDER

A new bulletin from The Pfaudler Co. serves as an excellent introduction to the operation mechanics and multi-purpose uses of the firm's glassed-steel conical dryer-blender. Advantages of glassed steel construction are included as well as specifications and dimensions of the 2, 4, 6 and 8 foot models. A listing of accesories plus installation, operational and maintenance procedures are covered in detail. The bulletin is available by

CIRCLING 63 ON SERVICE CARD

64—BLENDER BULLETIN

The new Falcon sanitary design ribbon blenders are engineered for fast efficient mixing of powders, granulars, pastes or liquids, according to Falcon Manufacturing Div., First Machinery Corp. The firm's new bulletin includes photographs and diagrams as well as specifications of the various models. For a free copy

CIRCLE 64 ON SERVICE CARD

65—FLUID ENERGY JET-O-MIZER

A new bulletin from Fluid Energy Processing & Equipment Co. describes the "Jet-o-mizer," which its maker says is "the modern mill for processing heat sensitive organic toxicants." The mill uses air as the elastic grinding fluid, and there are no moving parts to generate heat, according to the company. To obtain a copy of the bulletin, just

CIRCLE 65 ON SERVICE CARD

66—LAB MIXER BULLETIN

Sprout, Waldron & Co. has published a new bulletin describing in detail its Style "K" Laboratory Mixer, designed specically for laboratory studies, pilot plant work and small capacity production mixing of dry or semi-dry materials, slurries and heavy density liquids. Construction details, specifications, dimensions and design features are covered. For your copy,

CIRCLE 66 ON SERVICE CARD

Packaging

67—PORTABLE BAG CLOSER

The Fischbein portable bag closer weighs only 10½ pounds, but can handle all types of bags, reports Dave Fischbein Co. Any of its bag closers can be used three different ways, says Fischbein—1. completely portable, 2. suspended with counterbalance, and 3. on carriage conveyor for closing small bags. For details,

CIRCLE 67 ON SERVICE CARD

68—CROWN "CADDIE"

Crown "Caddie," the multiwall with a handle, is strong, convenient, attractive and versatile, according to Crown Zellerbach Corp. The handle is strong, paper-covered sisal, sewn through all three piles, says the manufacturer, and the multiwall bag sift-proof, contamination-proof and pilfer-proof. For more details,

CIRCLE 68 ON SERVICE CARD

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Materials Handling

69—CUTAWAY BROCHURE ON LIFT TRUCKS

An interesting "Cutaway" brochure describing the Yale Worksaver line of rider-walkie trucks has been published by Yale Materials Handling Div. Using sectionalized views and a system of unique die-cut pages, the booklet pictorially disassembles the Worksaver to point out all its operating features. Yale Worksavers are produced in pallet, platform, stacker and tractor models.

For your copy,

CIRCLE 69 ON SERVICE CARD

70—NEW CATALOG BY CHAIN BELT

"Mechanical Power Transmission and Conveying Machinery" is the title of a new catalog from Chain Belt Co. Descriptions, specifications, application information and selection data on Chain Belt products for power transmission, conveying and elevating service are included. For a copy

CIRCLE 70 ON SERVICE CARD

71—HOPPERS FOR WEIGHING, STORAGE

A dual-purpose hopper for the weighing or storage of fluffy, difficult-to-handle dry materials is described in a product data sheet offered by Richardson Scale Co. The bulletin discusses operating details, capacities, construction features and methods of charging and discharging. Details of construction and installation are shown in three photos and one schematic drawing. For a copy

CIRCLE 71 ON SERVICE CARD

72—DIAL SCALE CATALOG

Scales for a wide cross-section of industry and agriculture are shown in a new illustrated catalog of dial scales just released by The How Scale Co. Listed are specifications including dial graduations, capacity, platform dimensions and other key facts.

Copies are available by

CIRCLING 72 ON SERVICE CARD

Miscellaneous

73—SAMPLING EQUIPMENT

A product listing is available from Soiltest Inc. covering its sample splitter, sand attachment, testing screen, sample bags and other supplies. Included are illustrations, specifications and prices. For a copy

CIRCLE 73 ON SERVICE CARD

74—CYCLONE BROCHURE

Performance data of all its Cyclone models is presented in a 16 page brochure from Heyl & Patterson. The two-color booklet also shows exploded views of the cyclones and includes pictures of field installations. Copies are available by

CIRCLING 74 ON SERVICE CARD

75—HEAVY DUTY V-BELT

A four page color bulletin issued by Manhattan Rubber Div. of Raybestos-Manhattan, Inc., describes a new Condor LS V-Belt made for long center, heavy duty drives. The belt features a precision proportioned construction reported to eliminate V-Belt whip and turn-over that leads to belt failure, the manufacturer reports. A copy can be had by

CIRCLING 75 ON SERVICE CARD

76—CHEMICO NH_3 PLANTS

A simplified flow chart in Chemical Construction Co.'s six page brochure on ammonia synthesis plants shows the numerous choices the company offers for the preparation and purification of gas before it enters the synthesis loop. Also included are the advantages Chemico claims for its plants and a feed stock chart. To secure a copy

CIRCLE 76 ON SERVICE CARD

77—COLE TANK BOOKLET

"Tanks and Equipment for the Plant Food Industry" is the name of a booklet being offered by Cole Manufacturing Company. This booklet gives information on welded aluminum tanks in all sizes and types for nitrate solutions. You can obtain a free copy by

CIRCLING 77 IN SERVICE CARD

See page 52 for information on these Reader Service Numbers:

78—Amazite Plastic Resin 79—Gross Bagger

80—Liquid Seed Treater

Arcadian® News

Volume 3 | For Manufacturers of Mixed Fertilizers | Number 3

Tips to Help You Speed Production

Another late season is shaping up. This means that last-minute buying by farmers will require peak production to get the tonnage out. Manufacturers who are able to mix and ship at a rapid rate will make more sales.

There are many things you can do now to prepare to meet this situation. Arrange for your raw materials in advance so that you will have supplies on hand when needed. Organize traffic patterns for incoming and outgoing trucks, to speed handling. Set up a routine for checking equipment, to avoid breakdowns. Plan to use late-season, extra bin space for dumping in small piles for faster curing. Plan to keep bagged fertilizer stacked low to reduce bag set.

Selection and use of the proper ARCADIAN® Nitrogen Solutions can be a big help in speeding output. For example, these Solutions, direct from tank car or storage, can supply in one operation different forms of nitrogen often added as separate materials. This saves time, labor, traffic and expense.

Mixtures made with large amounts of solid nitrogen materials cure slowly. It pays to ammoniate with ARCADIAN Nitrogen Solutions at maximum rates to produce mixtures that cure more rapidly. The increased ammoniation rate pays off in extra volume of better quality goods.

ARCADIAN Nitrogen Solutions with a low water content help to produce mixtures that cure faster, especially when used with superphosphate of relatively high water content. For granular fertilizers, NITRANA® Solutions 2M, 3M, 3MC, 7 and some URANA® are ideal. For non-granular fertilizers, URANA® 10 or 13 are generally most suitable.

The ARCADIAN Manual on Nitrogen Fertilizer Solutions for Fertilizer Manufacturing contains useful information to help you produce quick-curing quality fertilizers. If you do not have a copy, obtain yours from Nitrogen Division, Allied Chemical, 40 Rector St., New York 6, N. Y.

Many fertilizer manufacturers have found that they can mix and ship at a rapid rate, by ammoniating with URANA Solutions. The improved crystal structure produced by URANA reduces hardness of set in the pile and secondary caking in the bag. You get faster cooling and curing in rehandling ammoniated fertilizers before storing.

Your Nitrogen Division technical service man is familiar with methods and materials that speed production of good-quality mixed fertilizers. Getting his advice and assistance now may help you to mix and ship more tonnage during your peak period. This service is available to customers without charge. Simply contact Nitrogen Division, Allied Chemical, 40 Rector Street, New York 6, N. Y.

It Pays to Be Ahead of Your Competition

The more you put into mixed fertilizers to benefit the farmer, the more difficult you make it for home-mixers to match your product and your service. Producing better fertilizers is one of the best ways to stay ahead of your competition.

The term "complete fertilizer" once meant nitrogen, phosphorus and potash. Today "complete fertilizer" can mean nitrogen, phosphorus, potash, calcium, sulphur, and magnesium . . . plus "trace elements" such as boron, copper, iron, manganese, zinc, molybdenum and cobalt, as needed by the crop and the soil. Some complete, mixed fertilizers now also contain insecticides in addition to plant foods.

TONNAGE OPPORTUNITY

The fertilizer manufacturer who simply mixes sources of nitrogen, phosphorus and potash, without considering the complete needs of the crop and soil, is bound to face stiff competition.

Every farmer prefers to use fertilizer that contains everything his crop needs, over and above what his soil can supply, to produce profitable yields. He also prefers a homogeneous, chemically-blended fertilizer that is well-cured to stay in good condition in storage and flow freely through his distributor.

Proper selection and use of nitrogen in manufacturing mixed fertilizers can be a highly-important factor in winning the battle against competition. Most crops need more nitrogen than any other plant food. Most crops also need graduated feeding with nitrogen that becomes available according to the feeding schedule of the crop.

When fertilizer contains the correct forms and amounts of nitrogen in balance with other plant foods, the farmer can supply the complete needs of his crop with one trip across his field. This saves time and labor and makes fertilizer more economical and more attractive to the farmer.

The fertilizer manufacturer who supplies the complete nitrogen needs of a crop with mixed fertilizers reduces the need for straight nitrogen materials. This increases his mixed goods and plant food sales at a greater profit than he usually makes from selling straight nitrogen materials.

The newly-developed, modern ARCADIAN® Nitrogen Solutions make it easy and practical to ammoniate superphosphate to produce high-nitrogen, high-analysis, good-condition mixtures. By proper selection of Solutions, fertilizers can be made to contain various forms of nitrogen, such as nitrate, urea, and ammonium nitrogen.

Home-mixers and small blenders are not equipped to ammoniate superphosphate, a big advantage enjoyed by the fertilizer manufacturer. Ammoniated superphosphate not only puts nitrogen and phosphorus into the fertilizer, it also adds calcium and sulphur. And it provides an excellent base to which other ingredients can be added as needed by the crop and soil. And proper ammoniation enables the manufacturer to produce high-analysis, free-flowing fertilizers.

Feed manufacturers have been highly successful in holding and building their market by producing a complex product containing many ingredients needed by livestock. Fertilizer manufacturers can be equally successful by putting more in their product . . . more of the needs of crops and soils . . . more free-flowing, non-segregating, easy-handling quality . . . more economy and more efficiency. This is the way to stay ahead of your competitor who cannot match your superior product.

Shown above is another powerful billboard in the continuing Nitrogen Division advertising campaign to urge farmers to purchase their plant food in the form of mixed fertilizers. This billboard is now appearing in hundreds of locations in leading farming areas where it will be seen by millions of farmers. Nitrogen Division, Allied Chemical, produces and sells nitrogen. But Nitrogen Division has always aggressively supported the importance of using nitrogen in a balanced fertilizer program. We trust these efforts increase your sales. If you wish a full-color miniature reprint of the poster shown above, request this from Nitrogen Division, Allied Chemical, 40 Rector St., New York 6, N. Y.

Fertilizer performance in the field is really what counts to the farmer. Properly-used fertilizer is worth two to five times its cost, in yields and profits.

But, if an unsuitable analysis is used or the fertilizer is improperly placed, fertilizer can be a costly production item. And a low rate of use is usually much less profitable to the farmer than adequate application.

Every fertilizer manufacturer, salesman and dealer owes it to his customers to know how to use fertilizer to make crops make the most money. Profits for the farmer and the fertilizer man depend on the proper use of fertilizer.

It takes time and effort to learn how to recommend a profitable fertilizer program to farmers. And time is money! But when you sell extra bushels and extra profits, instead of simply selling N, P and K, a farmer is willing to pay for YOUR product and YOUR service. He gets more results per dollar invested.

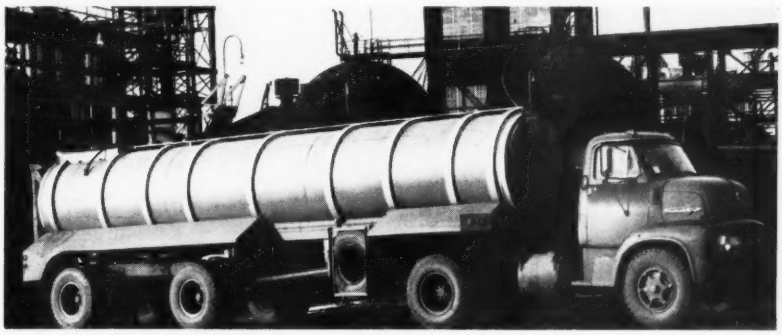
Many surveys show that the farmer depends more on the dealer than on anyone else for advice on fertilizers. Alert dealers are taking advantage of this fact to sell a program. Thus they get a better price for fertilizer and more repeat sales. Crop-producing power and profit-potential are more important to the farmer than price.

Don't make price the important sales point. Somebody else will always undercut you!

EXPANDING UREA PRODUCTION. To meet increasing agricultural and industrial demands for urea, Nitrogen Division, Allied Chemical, is now enlarging the productive capacity of its plant at South Point, Ohio. Urea is used in making ARCADIAN® URANA® Nitrogen Solution for manufacturing mixed fertilizers, URAN® Nitrogen Solution for direct application to the soil, UREA 45 pelleted nitrogen fertilizer, PROCADIAN® Urea Feed Mixture, and Crystal Urea for industrial use. In 1954, the South Point plant introduced a new process for urea synthesis developed by Allied Chemical research. This process is capable of producing urea of exceptional purity.

Where do farmers seek advice on fertilizers?

Which sources of information does the farmer depend on for advice on the fertilizer he buys? Some pertinent answers to this question are contained in the results of a recent survey by an independent research organization employed by Nitrogen Division, Allied Chemical. Motivations which influence fertilizer buying were studied in four midwestern states. PART I of the results has already been distributed and PART II is now available. To obtain your free copy, simply request Farm Fertilizer Survey, PART II, from Nitrogen Division, Allied Chemical, 40 Rector St., New York 6, N.Y.



TANK TRUCK DELIVERY. In addition to operating the largest fleet of railway tank cars in the industry for shipment of nitrogen solutions, Nitrogen Division, Allied Chemical, also makes deliveries in some areas in tank trucks like that shown above. The high-pressure tanks have a capacity of 4,575 to 5,090 gallons and the trucks are equipped for loading and unloading.

HERE'S THE BIG LINE OF Arcadian® NITROGEN SOLUTIONS

When you purchase your nitrogen requirements from Nitrogen Division, Allied Chemical, you have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You are served by America's leading producer of the most complete line of nitrogen products on the market. You get formulation assistance and technical help on manufacturing problems from the Nitrogen Division technical service staff. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions.

	CHEMICAL COMPOSITION %						PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	26
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.188	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.052	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
10	44.4	24.5	56.0	10.0	9.5	11.0	1.108	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.081	25	- 7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	12.7	1.052	29	1
U-A-S®									
A	45.4	36.8	—	32.5	30.7	16.2	0.925	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.972	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	24.3	0.618	211	—

Other ARCADIAN® Nitrogen Products: UREA 45 • A-N-L® Nitrogen Fertilizer Ammonium Nitrate • American Nitrate of Soda • Sulphate of Ammonia

NITROGEN DIVISION Allied Chemical & Dye Corporation

MAIN OFFICE: 40 RECTOR STREET, NEW YORK 6, N. Y., PHONE HANOVER 2-7300

Hopewell, Va., P. O. Drawer 131.....Cedar 9-6301
Ironton, Ohio, P. O. Box 98.....Ironton 8-4366
Omaha 7, Neb., P. O. Box 166.....Bellevue 1464
Raleigh, N. C., 16 W. Martin St.....Temple 3-2801
Columbia 1, S. C., 1203 Gervais St.....Alpine 3-6676
Atlanta 3, Ga., 127 Peachtree St., N. E. Jackson 2-7805
Memphis 9, Tenn., 1929-B South 3rd St. Whitehall 8-2692
Columbia, Mo., P. O. Box 188.....Gibson 2-4040
Indianapolis 20, Ind., 6060 College Ave. Clifford 5-5443
Kalamazoo, Mich., P. O. Box 869.....Kalamazoo 5-8676
St. Paul 4, Minn., 45 N. Snelling Ave.....Midway 5-9141
San Francisco 4, Cal., 235 Montgomery St. Yukon 2-6840

FARM CHEMICALS People

American Agricultural Chemical Co. Dr. Joseph D. Dalton has joined the Research Dept. to participate in the firm's continuing fertilizer research program.

Transfer of A. P. McKeown, former chemist at Pierce, Fla., to Carteret, N. J. as chief chemist of the Chemical Control Laboratory also was announced.

American Potash & Chemical Corp. Parker S. Dunn, vice president of manufacturing, has been elected to the board of directors. Since joining AP&CC in 1951 as assistant vice president he has played a major role in the company's chemical upgrading program.

Dunn

Atlas Powder Co. has appointed Dr. Sydney Steele director of public relations. He has been acting director of the department since last September.

Battelle Memorial Institute. Dr. B. D. Thomas, scientist and research administrator, succeeds Dr. Clyde Williams as president. Dr. Thomas has been active head of Battelle since he was named director a year ago.

Best Fertilizers Co. Lowell W. Berry, president, reports the appointment of Col. Thomas C. Compton, USA (Ret.) as his executive assistant. He will locate in the firm's Oakland office.

Ray L. Hobbs, newly named chief engineer, will be in charge of all maintenance and new construction engineering in the present Lathrop plant and the anhydrous ammonia plant now under construction.

California Spray-Chemical Corp. New sales representative is Jerry A. E. Knopf. He will work out of the Calspray office in Blythe, Calif.

Commercial Solvents Corp. Loy A. Everett, formerly with Virginia-Carolina Chemical Corp., has been named assistant sales manager of CSC's Agricultural Chemical Sales Dept. His responsibilities include the development of marketing programs for the company's expanded production of nitrogen fertilizers and activation of these programs on a regional basis.

Everett

Davison Chemical Co. James B. Hattman becomes district representative, with offices in Tulsa, Okla. He goes to Davison from Houdry Process Corp., where he was catalyst sales engineer in the Chemicals Div.

Diamond Alkali Co., Silicate, Detergent, Calcium Div. appointments: Chester D. Rudolph to general superintendent, Painesville, O.; George V. Olle to superintendent of the pure calcium products plant.

DuPont Co. The Chemical Sales Div. of the company's Polychemicals Dept. has announced new positions for Dr. Myer F. Gribbins, Jac O. Ullman and Dr. Frank G. Keenen. Gribbins becomes manager of the Ammonia Products Section. Ullman replaces Gribbins as assistant sales manager of the Nitrogen Products Section and Keenen is named associate laboratory director for the department's sales service laboratory at Chestnut Run, near Wilmington, Del.

Eastman Chemical Products, Inc. has reorganized the field sales activities of its Chemical Div. into three regional areas.

Newly appointed regional sales managers are Robert H. Cannon, New England and Middle Atlantic states; John H. Sanders, for areas served by the division's Cleveland, Cincinnati and Greensboro, N. C. offices and other areas of the south and southeast; and Decatur B. Campbell, Jr. for the mid-western area.

Emulsol Chemical Corp. has added T. William Mather to its sales staff. Serving Ohio, Western Pennsylvania, Upper New York state, West Virginia and Eastern Kentucky, Mather will headquarter in Emulsol's new Akron, Ohio, sales office.

Escambia Chemical Corp. Formerly assistant director of research, Dr. W. Mayo Smith moves up to director of research. Escambia's research and development activities will be moved late this spring to the company's new research center in Wilton, Conn., where Dr. Smith will be in charge.

Farmers Cooperative Exchange. Henry W. Stoke, 61, head of the Washington branch of the FCX Farm Chemical Dept. at Washington, N. C., died in Raleigh, N. C., Jan.22.

Federal Chemical Co. appointments: T. M. Dues and D. T. Morris to assistant general sales managers, and W. N. England to Louisville Div. sales manager.

Ferro Corporation. Election of Harry T. Marks to the presidency of Ferro has been announced by the firm's board of directors.

Fairfield Chemical Div., Food Machinery and Chemical

FARM CHEMICALS *People*

Corp. Russell B. Stoddard, formerly manager of the division, is retiring from active service with the company. He now will serve FMC on a part time basis as a consultant in his specialty of pyrethrum chemicals and other pesticide materials.


Stoddard

Freeport Sulphur Co. Augustus C. Long, chairman of the board of directors and chief executive officer of The Texas Co., has been elected a member of the Board of Freeport.

Hubbard-Hall Chemical Co. Appointment of F. Herbert Mackay, formerly vice president of Olds & Whipple, Inc., to a position in Hubbard-Hall's Agricultural Div. has been announced. Mackay, will be concerned chiefly with the purchase, production and sale of fertilizers designed for growing tobacco.

International Minerals & Chemical Corp. Judson H. Drewry is new southern area sales manager for the Phosphate Minerals Div. He will headquarter in Atlanta, Ga.

Merck & Co., Inc. Reorganization of the sales and marketing area of the Chemical Div. into four separately functioning departments has been completed.


McCabe

Each department will operate in specialized areas under the supervision of a marketing director. Appointed as directors are J. E. McCabe, agricultural products; H. P. Sarkison, medicinal products; R. W. Hayes, general products; and G. C. Moore, distributive products.

National Potash Co. Omar Sanders has been retained by the company to assist in its sales activities. He had been manager of Fertilizer Industries, Inc., until his retirement last June.

Nitrogen Div., Allied Chemical & Dye Corp. appoints two new vice presidents: George B. Meredith in charge of production, and Frank O. Agel in charge of development.

The newly created position of chief agronomist has been filled by Dr. Harvey J. Stangel. He is located at the division's main office in New York City.

R. M. Jones succeeds E. W. Harvey as director of technical service. In addition, Jones continues as manager of product development.

North American Cyanamid Ltd. Dr. L. P. Moore has been elected president, replacing F. S. Washburn.

Olin Mathieson Chemical Corp. Maurice A. Christensen has been named field representative for the Plant Food Div. in the Chandler, Ariz. area.

Pennsalt Agricultural Chemicals. Appointment of William S. Formwalt to general manager, Pennsalt Agricultural Chemicals, has been announced by Fred C. Shanaman, president of Pennsalt of Washington Div., Pennsalt Chemicals Corp. For the past year Formwalt served as assistant to the vice president of agricultural chemicals activities.


Formwalt

O. M. Scott & Sons. Harold C. Doellinger becomes assistant to the chairman. In his new assignment he will be director of statutory labeling.

Taylor Chemical Co. Henry J. Wood, who recently retired from Diamond Black Leaf Co., has been employed by Taylor Chemical.

Texas Gulf Sulphur Co. Sherman W. Clark, manager of the Agriculture Department of TGS, has been appointed chairman of the Houston, Tex., Chamber of Commerce agriculture committee.

United States Potash Co. has announced appointment of Ben Mills Allen as sales representative in the southeastern territory. He will work directly under Robert H. Walton, manager of the company's Atlanta office in the territory served by that office.

Velsicol Chemical Corp. As part of a general expansion in research and product development, Dr. George C. Schweiker has been named to the new position of manager of research. He goes to Velsicol from Hooker Electrochemical Co. where he was supervisor of polymer research.


Schweiker

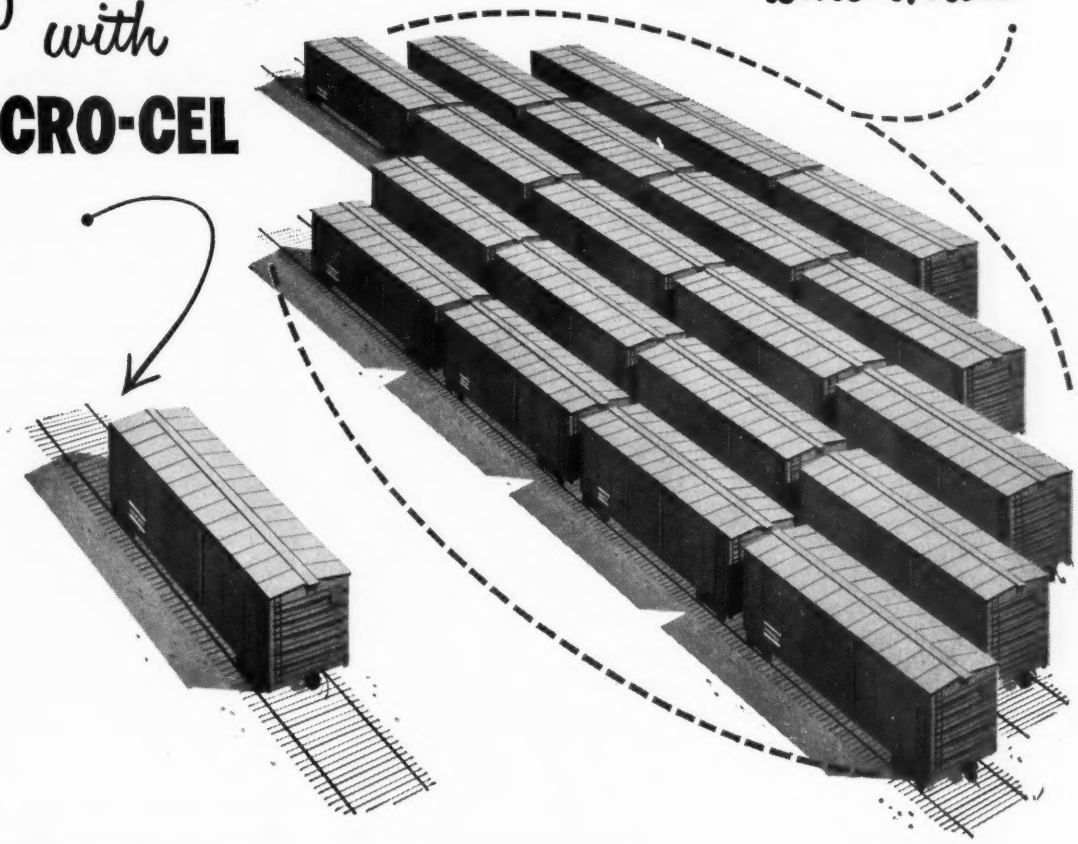
Three other appointments also were announced: Richard E. Noonan as marketing specialist, B. Gene Carter to the Midwest sales staff as technical sales representative, and Kenneth L. Schulz as technical sales representative for Indiana and Illinois.

Virginia-Carolina Chemical Corp. elections: David K. Wilson and Oliver Russell Grace to the board of directors, Russell L. Haden Jr. as vice president and Richard E. McConnell as treasurer.

Henry E. Wessell, former manager of marketing research for Monsanto Chemical Co.'s Research and Engineering Div., has been named assistant to the general manager of V-C's Fertilizer Div.

this shipment of 50% Heptachlor concentrate formulated with **MICRO-CEL**

—can provide application quantities like this—



The advantages of formulating insecticide dusts at the higher concentrations obtainable with Micro-Cel* is graphically demonstrated by the freight cars above. One car of 50% Heptachlor when let down to a 2½% poison at the point of application produces the equivalent of 20 cars of insecticide in the field. Since Micro-Cel costs no more than many other diluents, the substantial freight savings mean extra profits for you.

PROVEN WITH MANY POISONS

Micro-Cel, a new line of synthetic calcium silicates developed by Johns-Manville, has been tested and proven at such high dust and wettable powder concentrates as:

75% DDT	**70% Toxaphene**
75% Aldrin	**75% Dieldrin**
50% Aramite	**50% Chlordane**

Experiments with other poisons are under way today.

IMPROVES FLOWABILITY

Micro-Cel—"the powder that flows like a liquid"—reduces caking, increases flowability and gives more uniform coverage with dry dusts. Other important properties include large surface area, small particle size and high bulking action.

Ask your Celite engineer to help you adapt Micro-Cel to your particular requirements, or mail coupon below.

*Micro-Cel® is Johns-Manville's new absorbent-grinding aid designed specifically for the insecticide formulator.

Johns-Manville

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SYNTHETIC CALCIUM SILICATES

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Please send ☐ further information; ☐ samples of Micro-Cel. I am interested in using Micro-Cel with the following poisons:

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Associations & Meetings

SOIL FERTILITY SOCIETY ORGANIZED IN OHIO

The Ohio Soil Fertility Education Society's board of directors met at Ohio State University on February 7. Objectives of the newly-formed organization are "To foster and promote the dissemination of useful and practical information regarding all forms of plant foods, its application to crops of all kinds, better cultural practices and other related information which will result in production of better crops and increased farm income."

Harry L. Cook, Ohio Farm Bureau, is president of the group; H. H. Tucker, Sohio Chemical Co., is vice chairman; and Dr. Gordon Ryder, Ohio State University, is secretary. The board consists of 12 men, representing the fertilizer and lime industries, banks, and agricultural extension.

MCA STUDIES INDUSTRY'S '57-59 BUILDING PROGRAM

About $96 million will be spent for domestic construction of new fertilizer chemical production facilities in 1958 and 1959, according to results of the Manufacturing Chemists' Association's Chemical Industry 1957 Construction Survey.

Projects now underway by the fertilizer industry will cost about $50.5 million. The price tag on scheduled construction is estimated at $45.5 million. Last year, fertilizer producers completed domestic construction projects which cost $114.8 million, the survey revealed.

MCA reported totals for all types of chemical production facilities as follows: Planned—$707,962,000; under construction—$1,835,166,000; completed—$1,302,312,000; grand total—$3,845,440,000.

NEW SAFETY PAMPHLETS AVAILABLE FROM NSC

Two new pamphlets on industrial safety and housekeeping have been published by the National Safety Council.

"Your Future . . . Keep It Clean" concentrates on housekeeping in the factory, while "We Know Better" points out that most workers know their jobs, have experience, and don't want to hurt others or themselves. Often, however, they disregard good sense.

Single copies are available free on request to NSC, 425 N. Michigan Ave., Chicago 11, Ill.

MONTANA GROUP HOLDS FIRST ANNUAL MEETING

Dean Travis, Jr., president; Art Wolcott, retiring president; Ray McGregory, sec.-treas. Not shown is George Mason, vice pres.

The first annual meeting of the Montana Plant Food Association was held recently at Montana State College, with President Art Wolcott (Farmers Union Central Exchange) presiding. About 20 manufacturers and distributors who serve the state were there.

An amendment to the constitution was passed allowing dealers to become voting members in the association.

Elected at the meeting were the following officers: President—Dean Travis, Jr. (J. R. Simplot and Co.), Vice President—George Mason (Montana Flour Mills) and Secretary-Treasurer—Ray McGregory (Phillips Chemical Co.)

The group, which was formed to promote the proper use of fertilizer in Montana, sponsored a meeting for dealers on February 11 and 12 at Montana State College, where latest information on fertilizer recommendations was given.

DATES ANNOUNCED FOR 35TH CFA CONVENTION

The 35th annual convention of the California Fertilizer Association will be held at the Ambassador Hotel, Los Angeles, November 9–11, William G. Hewitt, president, recently announced.

John Hooper of Wilson & Geo. Meyer & Co., Los Angeles, is chairman of the Convention Program Committee. Members of his committee include Thomas Barnard, Frank Scoville, Clark Sumner and Dexter Thompson.

Entertainment Committee chairman is Thomas Lathe, also of the Meyer firm. Assisting him are Robert J. Gigler and Frank McGrane.

At a meeting in San Francisco on January 17, James F. Sloan, president of the J. F. Sloan Co., was elected to the association's board of directors.

NOMINATIONS FOR AOAC'S HARVEY W. WILEY AWARD

Nominations are now being accepted for the Second Annual Harvey W. Wiley Award for Achievement in Analytical Methods, according to an announcement by Frank A. Vorhes, Jr., president of the Association of Official Agricultural Chemists.

The award, which consists of $500 in cash, goes to the scientist who makes an outstanding contribution to the development of methods of analysis for foods, drugs, cosmetics, fertilizers, pesticides and feeds, or for use in general analytical chemistry.

April 1 is the deadline for nominations. Nominees need not be members of the Association. A general statement regarding the award may be obtained from the secretary, William Horwitz, Box 540, Benjamin Franklin Station, Washington 4, D. C.

MCA LABELING CONF. AT HOUSTON APRIL 30

The Shamrock Hotel in Houston, Tex., will be the site of the Manufacturing Chemists' Association's 1958 Precautionary Labeling Conference. Approximately 250 representatives of industry and government are expected to attend the April 30 meeting.

On the agenda is discussion of problems and requirements indigenous to the labeling of packaged products of the chemical and related industries.

NORTH CENTRAL BRANCH ESA, MEETS MARCH 26

The North Central Branch of the Entomological Society of America will hold its 13th annual conference at the Sheraton-Jefferson Hotel, St. Louis, Mo., March 26–28. More than 400 entomologists from the Midwest are expected to attend the meeting.

On the program for general sessions of the branch are addresses by Dr. Robert L. Metcalf, ESA president; Dr. Randall Latta, head, Stored-Product Insects Section, USDA; Dr. Fred L. Soper, director, Pan American Sanitary Bureau, World Health Organization; Dr. Walter Rothenbuhler, Iowa State College; R. W. Dean, New York Agr. Experiment Station; and Dr. Philip C. Stone, University of Missouri.

CALENDAR

Mar. 18-19. South Dakota Weed and Pest Control Conf., City Auditorium, Miller, S. D.

Mar. 18-20. Western Weed Conf., Hotel Davenport, Spokane, Wash.

Mar. 26-28. Thirteenth Annual Conf., North Central Branch, Entomological Society of America, Sheraton-Jefferson Hotel, St. Louis, Mo.

April 11-19. International Horticultural Congress, Nice, France.

April 13-15. California Fertilizer Conf., State Polytechnic College, San Luis Obispo.

April 13-18. National meeting, American Chemical Society, San Francisco, Calif.

April 22. Spring meeting, Western Agricultural Chemicals Assn., Hotel Biltmore, Los Angeles, Calif.

April 30. Precautionary Labeling Conf., Shamrock Hotel, Houston, Tex. Sponsored by the Manufacturing Chemists' Assn.

May 22-23. First annual meeting, Soil Science Society of North Carolina, Williams Hall, N. C. State College, Raleigh.

June 9-11. Association of Southern Feed and Fertilizer Control Officials, Heart of Atlanta Hotel, Atlanta, Ga.

June 12. Fertilizer Safety Executive Comm., Hotel Roanoke, Roanoke, Va.

June 12-14. Manufacturing Chemists' Assn. annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

June 15-18. National Plant Food Institute, Greenbrier Hotel, White Sulphur Springs, W. Va.

June 22-27. Pacific Branch, Entomological Society of America, San Diego, Calif.

June 25-27. Pacific Branch, Entomological Society of America, San Diego, Calif.

July 8-10. Pacific N. W. Fertilizer Conference, Pocatello, Idaho.

July 18-19. Southwest Fertilizer Conf. and Grade Hearing, Buccaneer Hotel, Galveston, Tex.

FARM CHEMICALS

Government

METHOXYCHLOR DUST OKAYED FOR DAIRY COWS

The use of methoxychlor for control of hornflies on dairy cattle is now recommended by USDA when applied as a dust treatment only. The department does not recommend the use of methoxychlor sprays applied to dairy cows for control of hornflies or other insect pests, but its application in dairy barns as a residual treatment for control of stable flies and houseflies is advised.

The current USDA recommendation is based on a recent decision of the Food and Drug Administration which stipulates that (1) No residue of methoxychlor is permitted in milk, but (2) there is no objection to the use of methoxychlor on dairy cows if the insecticide is applied so that no residue occurs in the milk. Studies have shown that when methoxychlor is properly applied as a dust treatment to only the backs of cows, it provides excellent hornfly control and no residue of the insecticide occurs in the milk.

VEGETABLE ADVISORS CITE RESEARCH NEEDS

There is a need for strengthened investigations of vegetable breeding, nematodes and pesticide residues, reported USDA's Vegetable Research and Marketing Advisory Committee at its annual meeting in Washington, Feb. 3–6.

The aim of nematode studies as seen by the committee would be to understand nematodes as primary invaders in bacterial and fungus-disease complexes, to develop efficient use of nematocides and to develop nematode resistance in vegetable varieties.

Concerning pesticide residue investigations, the advisors noted that lack of information about residues in or on vegetables is still a serious obstacle to the best use of pesticides in protecting crops from insect attack.

BROAD STUDIES OF SOIL, WATER PROBLEMS ADVISED

A program of broad studies on the complex soil and water conservation problems facing the nation was urged by USDA's Soils, Water and Fertilizer Research Advisory Committee at its recent annual meeting in Washington.

The committee named research in watershed runoff, irrigation efficiency, cropland moisture conservation and water movement in soils as among the most pressing needs in the area of work reviewed.

Other proposals which the group felt merit priority attention include more research on soil-water-plant relationships in humid areas.

USDA REPORTS ON MANUFACTURERS' 1957 STOCKS OF PESTICIDES

Carryover stocks of important pesticides on Sept. 30, 1957 averaged about as large as on the same date a year earlier, USDA has announced.

The department's annual survey, conducted in cooperation with the National Agricultural Chemicals Association, indicates that as compared with 1956, shorter stocks of DDT, lead arsenate and copper fungicides were more than offset by larger carryovers of 2,4-D, 2,4,5-T and calcium arsenate. Benzene hexachloride stocks were about the same size. Inventories of newer phosphorus insecticides, such as malathion and methyl parathion, showed some increase.

Fumigants are in larger supply than in 1956. They have not been included, however, in calculating the ratio of 1957 stocks to 1956 carryover.

The 1957 report is based upon data furnished by 165 major manufacturers of agricultural chemicals.

Material	All Stocks Reported As of Sept. 30, 1957	Percentage Reported Used in Mixtures	1957 Stocks As a Percentage of 1956 Stocks
	(1,000 lbs.)		
Aldrin, chlordane, dieldrin, endrin, heptachlor, toxaphene	32,477	19.3	108
Benzene hexachloride, including lindane (gross basis)	21,220	—	—
Benzene hexachloride, (gamma basis)	5,916	36.0	103
Calcium arsenate	8,259	15.3	168
Copper fungicides	9,328	7.6	80
2,4-D (acid basis)	17,368	40.9	177
DDT	24,252	36.3	77
Fumigants, grain and soil	49,636	—	—
Lead arsenate	3,101	25.0	65
Meticides, miscellaneous	1,317	58.3	85
Organic phosphorous compounds	(incomplete)	[1]54.3	[1]128
Sulfur, ground	30,282	53.6	87
2,4,5-T (acid basis)	4,327	40.6	307
Other fungicides	9,576	31.1	92
Other insecticides	9,191	42.6	130
Other weed killers	16,103	47.8	109
Miscellaneous, including rodenticides	3,400	—	—
Total	252,000	38.6	103

[1] Based on incomplete data.

Production — November, 1957

Compiled from Government Sources

Chemical	Unit	November 1957	November 1956	October 1957
Ammonia, synth. (anhydrous)	s. tons	310,535	264,436	322,557
Ammonia, byproduct liquor (NH_3 content)	s. tons	1,176	1,547	1,392
Ammonium nitrate, fert. grade (100% NH_4NO_3)	s. tons	204,180	142,415	211,716
Ammonium sulfate				
synthetic (technical)	s. tons	84,385	82,001	83,414
by-product	s. tons	68,560	77,569	75,167
BHC (Hexachlorocyclohexane)	pounds	———	———	820,157
Gamma content	pounds	———	———	228,892
Calcium arsenate (commercial)	s. tons	———	[1]	———
Copper sulfate (gross)	s. tons	4,568	———	4,160
DDT	pounds	9,017,326	10,640,771	8,931,661
2,4-D Acid	pounds	2,531,778	2,521,570	3,172,182
esters and salts	pounds	2,126,606	1,884,882[5]	2,364,741
esters and salts (acid equiv.)	pounds	1,729,104	1,381,952[5]	1,786,125
Lead Arsenate (acid and basic)	s. tons	[1]	[1]	459
Phosphoric acid (50% H_3PO_4)	s. tons	356,873	279,192	384,834
Sulfur, native (Frasch)	l. tons	445,908	514,772	462,145
Recovered[2]	l. tons	41,882	39,580	47,299
Sulfuric acid, gross (100% H_2SO_4)	s. tons	1,315,298	1,367,953	1,433,050
Superphosphate (100% APA)	s. tons	205,821	208,098	216,276*
Normal and enriched (100% APA)	s. tons	113,624	130,437[3]	123,711*
Concentrated (100% APA)	s. tons	73,598	59,855	74,187*
Other phos. fertilizers (incl. wet-base goods)	s. tons	18,599	16,091[4]	18,378
2,4,5-T Acid	pounds	414,595	514,085[5]	308,405
Urea (total primary production)	pounds	93,566,480	81,101,801	88,773,306

*Revised. [1]Withheld to avoid disclosing figures for individual establishments.
[2]Recovered sulfur of a purity of 97% or greater. [3]Excludes enriched superphosphate, quantities of which if added to normal superphosphate would account for less than 2% of the total.
[4]Excludes wet-base goods, quantities of which if added to other phosphatic fertilizers would account for less than 6% of the total. [5]Partly estimated.

Equipment & Supplies

PROTECTION FROM ACIDS PROVIDED BY RESIN

Hallemite Mfg. Co. states that its new resin Amazite protects floors in industries using acid and acid compounds as the one shown above.

A pure plastic resin which is said to provide protection against destructive acids and caustics as well as resistance to abrasion has been developed by The Hallemite Mfg. Co.

Amazite may be applied directly over new or old concrete, terrazzo, brick, stone, marble, slate, plaster, metal or wood. Thick applications may be trowelled on to transform rough, pitted floors into smooth traffic areas. Surfaces in good condition may be protected and preserved by brushing on the treatment like a paint.

Formulations for trowel, paint brush or spray gun application are available in Clear (Amber), Tile Red and Cement Gray colors. For more details,

CIRCLE 78 ON SERVICE CARD

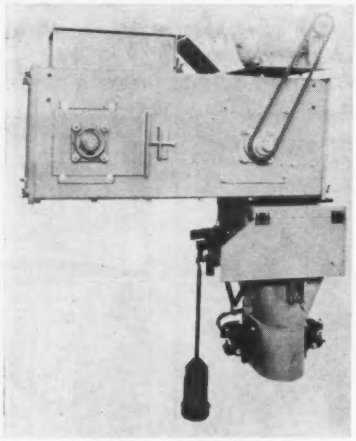
STRETCHABLE PAPER AIDS PACKAGING

Commercial production of a new stretchable paper product developed by West Virginia Pulp and Paper Co., under a patent held by Cluett, Peabody & Co., Inc., began last month at the paper company's Charleston, S. C., mill. The paper is being manufactured on a new $25,000,000 paper machine capable of producing up to 225 tons per day.

Company officials pointed out that varying degrees of controlled strength imparted by mechanical means gives the news paper unprecedented toughness. They added that the extensible paper is smooth in surface and resembles a regular sheet of paper, except for its flexibility and toughness.

Paper made by the new process is being marketed under the trade name of Clupak, owned by Clupak, Inc. The first papers to be sold commercially are kraft grades to be used primarily in the manufacture of multi-wall sacks, specialty bags, wrappers and other kraft packaging products.

BELT-FED GROSS BAGGER HAS AUTOMATIC CUT-OFF



Richardson Model GA-17

Richardson Scale Co. reports its new Model GA-17 gross bagging scale provides accurate high speed bagging at the fundamentally low cost of a gross weigher. It is designed for use with open mouth textile and multi-wall paper bags, in sizes from 10 lb. to 140 lb. capacity.

In operation, the bag is slipped on the bag spout and held in position by a Cam Grip Bagholder. The operator pulls the gate handle, which opens the radial gate and starts the belt feeder. The weighing operation then proceeds automatically. When the beam comes to balance, the belt feeder stops and the gate cut-off closes.

For additional information

CIRCLE 79 ON SERVICE CARD

LIQUID SEED TREATER

Panogen Co. has introduced a new automatic liquid seed treater which will treat 350 bushels of seed per hour.

The model, designated LC, is of the same basic design as the larger automatic Panogen Treaters. According to Panogen, treating seed with the new model is a complete pushbutton operation. Once lines are attached to shipping container of liquid seed disinfectant, treating can proceed all day long without stopping the machine. No mixing or handling of chemical is required. For more information,

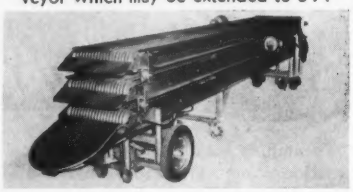
CIRCLE 80 ON SERVICE CARD

TELESCOPING BOX CAR AND TRUCK LOADING CONVEYOR

Designed to automatically compensate for variations of dock levels to truck beds and box car floors, Power-Curve Conveyor Co.'s 17' conveyor top will extend to 51' (bottom).

The manufacturer claims—the conveyor will deliver bags and packages right to stacking point and will retract under power with push button controls. The complete conveyor is mounted on swivel casters and can be moved easily to any location. The headstand is equipped with scissors jack to give 14 inch height adjustment.

Power-Curve's 17' power driven conveyor which may be extended to 51'.



Suppliers' Briefs

Beckman Systems Div. has appointed Ray St. Onge as advertising and sales promotion manager.

Chase Bag Co. Three new territory sales managers: P. E. Nelson, southeastern sales manager in Atlanta; Bill Sheets, Midwestern (Chicago), and K. L. Moore, eastern (Buffalo).

Fulton Bag & Products Co. has purchased the New Orleans and St. Louis plants of Fulton Bag & Cotton Mills. Organization remains essentially the same.

Witco Chemical Co. has named Floyd B. Myhre as assistant to the president, in charge of the Washington office.

Yale Materials Handling Div. Promotion of Louis W. Jander from eastern regional sales manager to assistant general sales manager has been announced.

FOR SALE OR PROMOTION

Established house plant food business incorporated in 1952. Was extensively advertised in Northeast resulting in a lucrative mail order business. Product is a powdered plant food packaged in 4 and 8 oz. tubes, sold at retail, for stimulating growth and flowering of house plants. Originator of this product deceased, and new owner lacks necessary knowledge to promote this item. Contact Plant Magic Products Inc., 40 Highland Avenue, Route 6, Seekonk, Massachusetts.

FOR SALE: Beaird Rotary Dryers 4 x 30; Rotary Steam Tube Dryers 4′ x 30, 6 x 45. Dewatering Presses: Louisville 8-roll 36″, Davenport #2A, 1A. Mikro Pulverizer #2DH. Ribbon Mixer: 336 cu. ft. Steel & Stainless Steel Tanks: 400 gal. to 9500 gal. SEND US YOUR INQUIRIES. PERRY, 1430 N. 6th St., Phila. 22, Pa.

HELP WANTED

SALESMAN—AGRICULTURAL

Major Agricultural producer seeks man for mid-west territory. Age 30–45, degree in technical science, agriculture or agronomy preferred, with selling experience in chemical field. (Salary in range of $10,000 per year.) Give education, experience and references. Address "655" Care FARM CHEMICALS, 317 N. Broad St., Philadelphia 7.

RADIATION RESEARCH AIDS INDUSTRY

The Atomic Energy Commission, through its Schenectady Operations Office, has made $191,000 available to Rensselaer Polytechnic Institute for further research in radiation chemistry. Members of the Institute are testing the feasibility of using glass fibers as part of fuel elements in a nuclear reactor.

Institute scientists have disclosed that experiments conducted at the Brookhaven National Laboratories had shown that the use of fine glass fibers, into which radioactive uranium oxide had been incorporated, has greatly improved the process they originated for converting heated and compressed air into nitrogen-oxygen compounds through fission recoil energy. The nitrogen oxide derived in this direct path from nuclear energy can be used in the production of nitric acid and fertilizers.

NEW HERBICIDAL COMPOUNDS

Commercial production of a new group of herbicidal compounds based on 2,3,6-trichlorobenzoic acid has been undertaken by Heyden Newport Chemical Corp. in the company's recently completed facilities at its Fords, N. J. works.

The company reports that herbicides based on the new compounds show outstanding promise for control of bindweed and other deep-rooted perennial weeds on agricultural lands and industrial areas. Simon Askin, firm president, stated that their effectiveness against persistent weed species at economic dosage levels has been demonstrated repeatedly in a cooperative program of several years duration with weed control authorities in most states where weeds of this type are a problem in land management.

The new herbicides will be made available for commercial use during the 1958 growing season.

CHLORINATED COMPOUNDS DEVELOPED BY DIAMOND

Six new chlorinated compounds utilizing p-xylene as the basic raw material have been developed by Diamond Alkali Co. Available in semi-commercial quantities, the compounds are being produced on a pilot-plant scale at the company's organic chemicals plant at Newark, N. J.

Three of these new products are ring chlorinated, while the remaining three are chain chlorinated.

The ring chlorinated compounds are identified as 2-chloro-p-xylene, 2,5-dichloro-p-xylene, and 2,3,5,6-tetrachloro-p-xylene; the chain chlorinated products, which exhibit greater chemical activity, are a-chloro-p-xylene, a, a'-dichloro-p-xylene, and a, a'-hexachloro-p-xylene.

Diamond indicated that all of the new compounds can react further in such unit processes as chlorination, chloromethylation, nitration, sulphonation and oxidation.

GLYODIN ACCEPTED AS SPREADER-STICKER

Union Carbide Chemicals Co., div. of Union Carbide Corp., has announced that the statement "Glyodin can be used as a spreader-sticker" has been accepted by USDA for addition to the fungicide's commercial label.

Glyodin is being recommended by Union Carbide to control fruit diseases such as apple scab, sooty blotch, Brooks spot, peach brown rot, and cherry leaf spot. In addition, it causes spray to spread and stick more evenly and thoroughly over fruit tree foliage. The firm reports that the extra spreader-sticker benefit has resulted in Glyodin being recommended in Virginia for addition to the zinc-lime spray that is used to control peach bacteriosis, and in Massachusetts for inclusion with dichlone and ferbam for peach canker control.

SEVIN LABEL ACCEPTED ON TRIAL BASIS

Acceptance of a Crag Sevin experimental label for control of apple pests was granted by USDA, according to Crag Agricultural Chemicals Dept. of Union Carbide.

Sevin is 1-naphthyl N-methylcarbamate. A temporary tolerance is established for the 50 per cent wettable powder, for sale in limited amounts in 1958 to experienced apple growers for trial use.

Patent Reviews

FC

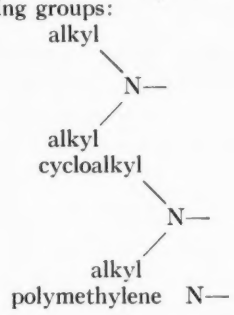
By Dr. Melvin Nord

PLANT GROWTH REGULANTS AND HERBICIDES

U. S. 2,812,247, issued Nov. 5, 1957 to Hans Gysin and Enrico Knusli, assigned to J. R. Geigy, discloses the use as plant growth regulants of O-phenyl carbamates of the general formula

Am—CO—O—Ar

where Ar is a phenyl or naphthyl radical unsubstituted or substituted with alkyl, alkoxy or alkylmercapto, amino or substituted amino or nitro groups or by halogen, and Am is any one of the following groups:



The patent cites examples of inhibitory action and of growth-promotion action.

FERTILIZERS

U. S. 2,812, 829, issued Nov. 12, 1957 to Gerlando Marullo and Rinaldo Mazzetti, assigned to Montecatini, Societa Generale per l'Industria Mineraria e Chimica, describes a process for separating gas mixtures containing carbon dioxide and ammonia, which mixture constitutes the effluent from the pressure synthesis of urea from carbon dioxide and ammonia, after separation by expansion from the urea produced.

The process involves the selective absorption of ammonia in an aqueous solution of ammonium nitrate or urea nitrate.

U. S. 2,812,858, issued Nov. 12, 1957 to Homer E. Uhland and assigned to International Minerals & Chemical Corp., describes a process for separating phosphate material from gangue constituents of Florida pebble phosphate ore, i.e., from the phosphate values normally lost in the tailings from the amine flotation stage of the flotation process.

It has been discovered that the amine reagents present on products recovered in amine flotation operations, which interfere with subsequent attempts at flotation, can be cheaply and effectively removed by mixing the amine flotation product in slurry form with so-called slime materials and agitating the mixture. During agitation the amine reagents are transferred to the slime particles. The mixture is then subjected to wet classification separations to remove the slime material from the flotation product solids. The deslimed solids may then be conditioned with anionic reagents for flotation.

U. S. 2,813,777, issued Nov. 19, 1957 to Gunder G. U. W. Swensen, assigned to Norsk Hydro-Elektrisk Kvaelstofaktieselskab, provides a process for the crystallization of nitrate from a nitric acid solution of crude phosphates, obtained by treating crude phosphates with nitric acid. The crystals are separated from the very fine insoluble impurities of the crude phosphate, by regulating their crystal size to 0.5-1.5 mm. (at least 80 per cent within this range). This is accomplished by cooling the solution 2-10 degrees C. below its saturation temperature, adding calcium nitrate seed crystals, and allowing the solution to cool further. The crystals are then filtered off by a coarse-meshed filtering material, through which the fine impurities pass.

U. S. 2,814,556, issued Nov. 26, 1957 to Ivan Christoffel and assigned to Allied Chemical & Dye Corp., provides a fertilizer having high plant food value, and having a low vapor pressure, low precipitation temperature, and good stability during storage. The product contains urea, and an ammonium hydrogen phosphate composition equivalent to

$(NH_4)_{(1.4-1.8)}\ H_{(1.6-1.2)}\ PO_4$

PLANT TONIC FOR PREVENTING CHLOROSIS

U. S. 2,813,014, issued Nov. 12, 1957 to John R. Alleson and Charles A. Hewitt, assigned to Leffingwell Chemical Co., has to do with a plant tonic for benefitting the growth of plants, particularly with respect to their nitrogen and iron acceptance and the relief of various deficiencies, as evidenced typically by "yellow leaf" and lime-induced chlorosis.

In order for iron to be made available to plants over a period of time, it must not only be derived from a soluble ionizable form, but the ionized or chelated iron must be maintained as such and against becoming insolubilized or combined in any form that would destroy its capacity for assimilation by the plants.

The source of iron used is ferrous sulfate. Together with this, citric acid is used, as a chelating compound for solubilized iron, and to lower the *p*H of high alkaline soils. Ammonium sulfate is also added, to increase the chelation effect of the citric acid, and to make nitrogen available.

PESTICIDES

U. S. 2,813,057, issued Nov. 12, 1957 to Johannes T. Hackmann, assigned to Shell Development Co., describes a method for protecting plants from attack by parasitic pathogens, such as fungi and bacteria.

It has been found that aromatic sulfonhydrazides, having substituted on the aromatic ring an alkyl radical containing 8 to 22 carbon atoms, are particularly effective in this respect. An example of such a compound is n-dodecylbenzene-p-sulfonhydrazide.

U. S. 2,814,582, issued Nov. 26, 1957 to Johannes T. Hackmann and assigned to Shell Development Co., discloses a fungicidal composition consisting of water-souble mono- and dialkanoyl hydrazines, where each alkanoyl radical contains up to 7 carbon atoms.

PEST REPORTS

Presented in cooperation with the Economic Insect Survey Section, Plant Pest Control Branch, Agricultural Research Service, USDA.

HIGH 1957 LOSSES TO EUR. CORN BORER

Figures recently released show that the European corn borer caused loss of approximately twice as many bushels of corn grown for grains in 21 states in 1957 as in 1956. The 1957 loss was estimated at over 180 million bushels valued at $158 million based on December price level. This was estimated to be approximately 6 per cent of the total national crop. The 1956 loss was over 97 million bushels with the highest loss since 1950 being in 1954 when over 191 million bushels were lost to the borer.

The state showing the heaviest loss to the European corn borer was Iowa with a 102,166,000 bushel loss. The next state was Nebraska with over 18,816,000 bushels lost, followed by Missouri, 16,399,000; South Dakota, 16,-351,000 and Illinois, 10,976,000. Each of the other reporting states had losses ranging from slightly less than 10 million bushels to only a trace loss for Vermont.

BOLL WEEVIL HIBERNATION COUNTS

Counts of cotton boll weevil in woods surface trash collected in four areas of Georgia during the fall of 1957 averaged 2,081 live weevils per acre of trash. The average for the fall of 1956 was 1,936 with the average for the past seven years being 1,300 live weevils per acre of woods trash. Area averages for 1957 and 1956 for the four Georgia areas are as follows: northwest (Gordon county) 1,113 and 2,904; north central (Spalding and Pike counties) 5,034 and 2,299; east central (Burke county) 1,791 and 774; and south (Tift county) 387 and 1,355 live boll weevils per acre of trash. Live weevils were found on 70 per cent of the farms examined with the maximum number per acre found on a single farm being 13,552 in Spalding county.

In the Hope area of southwestern Arkansas, counts averaged 3,472 live weevils per acre of woods trash compared with 1,398 in the fall of 1956. The McGehee area in the southeastern part of the state averaged 1,786 live weevils per acre of trash. This is a new area for hibernation study; consequently, no comparison can be made with previous years.

'HOPPER THREAT IN 1958 ON LARGE ACREAGE WESTERN RANGELAND

Cooperative surveys were conducted in late summer and early fall of 1957 by state and federal workers to determine the number of adult grasshoppers present particularly in the central and western parts of the United States. These surveys found populations on more than 18,000,000 acres of rangeland heavy enough to produce, if all factors are favorable, grasshoppers in economic numbers during the spring of 1958. The actual population to appear in 1958 will depend upon many factors, among which are the number of eggs laid by the populations found, the parasite and predator populations, and weather conditions during and following hatching. Surveys to be conducted this spring when the insect is in the nymphal stage will give a very good idea of the problem that may develop.

Surveys showed 6 million acres of rangeland in the Texas Panhandle which could have an economic population this spring. Montana is second high with about 5 million acres and California next with more than 3 million acres of rangeland. Eastern Colorado records 1.5 million acres and potential trouble spots are to be found in Washington, Oregon, Idaho, Wyoming, Utah, Nevada, New Mexico, Nebraska and South Dakota.

Cropland infestation potentials were found, in general, to be lighter than for the spring of 1957. Largest cropland threatened areas appear in Minnesota, Wisconsin, Kansas, Nebraska, North Dakota, South Dakota and Montana.

GENERAL INSECT ACTIVITY LIGHT DURING JANUARY

Cold weather throughout most of the United States during January and early February helped keep insect activity at a low level. Counts of greenbug on small grain in Oklahoma have been very light. The highest counts were scattered infestations of 50–500 per linear foot in wheat and barley in the Hennessey area of Kingfisher county. Occasional specimens were found in Major county, less than one per linear foot of wheat row in Logan county. Light infestations have also been reported from Curry and Quay counties, New Mexico. In Kansas a survey in four counties failed to show any greenbugs.

The spotted alfafla aphid also continues to be very light. A survey in four Kansas counties was negative and light in southern New Mexico. Low numbers continue throughout Oklahoma. In Tillman county a slight increase was noted late in January with counts of 0–30 per plant. Light infestations were reported in Rockwall county, Texas in early February.

The vegetable weevil was heavy in dichondra lawn roots at Riverside, California. This insect was also building up on weeds in East Baton Rouge Parish, Louisiana and attacking mustard and turnips in Jones county, Miss. ▲

Fertilizer Materials Market

FC

Philadelphia

February 20, 1958

Supplies of most raw materials are rather plentiful and prices are stable, but weather conditions are seriously interfering with any normal movement. Much improved demand is looked for later in the month.

Sulfate of Ammonia. While it is expected that there will be enough to meet normal requirements, the supply is not at all excessive. This is particularly true of coke-oven grade.

Ammonium Nitrate. Demand is rather slack following the activity in December (prior to price advances), and present weather conditions are not conducive to business. However, producers look for considerable improvement when the weather becomes normal.

Nitrate of Soda. Stocks are reported ample, and no price changes are suggested at this time.

Urea. The supply, while adequate, is not too abundant. The demand is moderate, and a recent suggestion of price change seems to have been dropped.

Blood, Tankage, Bone. The demand for blood and tankage is further improved and prices are higher. Present quotations for blood are $5.50 per unit ammonia ($6.68 per unit N) in New York area, and $6.50 ($7.90 per unit N) Chicago. The tankage prices are $5.25 ($6.38 per unit N) New York and $6.75 ($8.20 per unit N) in Chicago area. Bone Meal remains dull at $62.50 per ton.

Castor Pomace. Large stocks are reported on hand and price is $40 per ton.

Fish Scrap. Supplies are not too great and demand is somewhat slow. Scrap is quoted $124 to $126 per ton, and meal $128. to $130.

Phosphate Rock. Due to reduced production costs, prices were recently cut ten cents per ton for all grades.

Superphosphate. Supplies plentiful but movement very slow, due principally to unseasonable weather. Prices remain unchanged.

Potash. Supplies are quite sufficient to meet present needs, and prices remain unchanged. Demand shows a little improvement.

New York

February 20, 1958

Sulfate of Ammonia. Although domestic fertilizer demand is only fair, producers were said to be in a strong position as stocks on hand were small and there were several large export inquiries in the market for shipment to the Far East and other countries.

Ammonium Nitrate. No more price changes were noted on this material and producers looked for a better demand over the next 60 days.

Urea. Very little foreign material arrived in this country recently as domestic producers are able to take care of most of the demand at slightly better prices.

Nitrogenous Tankage. Some producers were reported to be sold out until June and a firm market is looked for the balance of this season. Prices range from $3.25 to $4.00 per unit of ammonia ($3.95 to $4.86 per unit N) f.o.b. shipping points.

Castor Pomace. Steady sales were being made at $40 per ton, f.o.b. shipping points and some imported material recently arrived at Southern ports at prices slightly under domestic material.

Organics. Trading was more active in organic fertilizer materials and prices in general tended to firm up. Because of recent cold weather the feed business improved with the result that a greater demand existed in that direction. Blood sold at $5.25 per unit of ammonia ($6.38 per unit N), f.o.b. Eastern points and tankage sold at $5.25 per unit of ammonia ($6.38 per unit N). Soybean meal was up a couple of dollars per ton in the last two weeks with last sales on the basis of $47.50 per ton in bulk, f.o.b. Decatur, Ill. Cottonseed meal sold at $59 per ton in bags, f.o.b. Memphis, Tenn. and linseed meal was quoted at $54 per ton in bulk, f.o.b. Minneapolis, Minn.

Fish Meal. Material was slightly firmer in price with last sales on the basis of $130 per ton, f.o.b. fish factories and stocks said to be low at certain points. Some imported material recently arrived at Pacific Coast ports.

Bone Meal. Steady business was reported from both the fertilizer and feed trade for bone meal with last sales made on the basis of $62.50 per ton, f.o.b. production points, with feeding bone meal selling slightly higher.

Hoof Meal. This material is in tight supply at present with last sales made on the basis of $5.75 per unit of ammonia ($6.99 per unit N) f.o.b. Chicago and some producers sold ahead for about 60 days. Demand was coming mostly from industrial users.

Superphosphate. Little change was reported in superphosphate although the price of phosphate rock was recently reduced a few cents per ton and some price cutting was said to be going on in sulfuric acid because of the slower demand from large industrial users.

Potash. Because of recent disappointing reports from the fertilizer trade, one large producer decided to cut domestic production about 10 per cent and several other producers were running on a reduced schedule. The severe winter weather played an important part and producers were hopeful that March might see shipments running on a normal basis again. ▲

Alphabetical List of Advertisers

Buyers' Guide

Classified Index to Advertisers in 'Farm Chemicals'

ALDRIN
Ashcraft-Wilkinson Co., Atlanta, Ga.

AMMONIA—Anhydrous and Liquor
Allied Chemical & Dye Corp., Nitrogen Div., N.Y.C.
American Cyanamid Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
Commercial Solvents Corporation, New York City
E. I. duPont de Nemours & Co., Wilmington, Del.
Escambia Chem. Corp., Pensacola, Fla.
Grand River Chem. Div., Deere & Co., Tulsa, Okla.
Mississippi River Chem. Co., St. Louis, Mo.
Phillips Chemical Co., Bartlesville, Okla.
Sinclair Chemicals, Chicago, Ill.
Sohio Chemical Co., Lima, O.
The Texas Co., New York City

AMMONIUM NITRATE
American Cyanamid Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
Commercial Solvents Corporation, New York City
Escambia Chem. Corp., Pensacola, Fla.
Monsanto Chem. Co., St. Louis, Mo.
Mississippi River Chem. Co., St. Louis, Mo.
Phillips Chemical Co., Bartlesville, Okla.

AMMONIUM SULFATE
See Sulfate of Ammonia

BAGS—BURLAP
The Burlap Council, New York City
Chase Bag Co., Chicago, Ill.

BAGS—COTTON
Chase Bag Co., Chicago, Ill.

BAGS—Multiwall-Paper
Chase Bag Co., Chicago, Ill.
Hudson Pulp & Paper Corp., N.Y.C.
Kraft Bag Corporation, New York City
Union Bag—Camp Paper Corp., New York City

BAGS—Dealers and Brokers
Ashcraft-Wilkinson Co., Atlanta, Ga.

BAG PRINTING MACHINES
Schmutz Mfg., Louisville, Ky.

BAG CLOSING MACHINES
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BAG FILLING MACHINES
Chase Bag Co., Chicago, Ill.
E. D. Coddington Mfg. Co., Milwaukee, Wisc.
Kraft Bag Corporation, New York City
Stedman Foundry and Machine Co., Aurora, Ind.
Union Bag—Camp Paper Corp., New York City

BHC AND LINDANE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Pennsylvania Salt Mfg. Co., of Wash., Tacoma, Wash.

BIN LEVEL CONTROLS
Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Stephens-Adamson Mfg. Co., Aurora, Ill.

BIN DISCHARGERS
Stephens-Adamson Mfg. Co., Aurora, Ill.

BONE PRODUCTS
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
Woodward & Dickerson, Inc. Philadelphia, Pa.

BORAX AND BORIC ACID
American Potash & Chemical Corp., Los Angeles, California
Woodward & Dickerson, Inc., Philadelphia, Pa.

BOX CAR LOADERS
Stephens-Adamson Mfg. Co., Aurora, Ill.

BROKERS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BULK TRANSPORTS
Baughman Mfg. Co., Jerseyville, Ill.

CALCIUM ARSENATE
American Agricultural Chemical Co., N. Y. C.

CAR PULLERS
Stephens-Adamson Mfg. Co., Aurora, Ill.

CARS AND CART
Stedman Foundry and Machine Co., Aurora, Ind.

CASTOR POMACE
Ashcraft-Wilkinson Co., Atlanta, Ga.
H. J. Baker & Bro., N. Y. C.

CHEMISTS AND ASSAYERS
Shuey & Co., Inc., Savannah, Ga.

CHLOROBENZILATE
Geigy Agr. Chems. Div. Geigy Chem. Corp. N.Y.C.

CHLORDANE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Velsicol Chemical Corp., Chicago, Ill.

CLAY
Ashcraft-Wilkinson Co., Atlanta, Ga.
Thomas Alabama Kaolin Co., Baltimore, Md.

CONDITIONERS
Ashcraft-Wilkinson Co., Atlanta, Ga.
H. J. Baker & Bro., New York City
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
National Lime & Stone Co., Finlay, Ohio
U. S. Graphite Co., Saginaw, Mich.

CONVEYORS
Baughman Mfg. Co., Jerseyville, Ill.
Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Finco Inc., North Aurora, Ill.
Joy Mfg. Co., Pittsburgh, Pa.
Stedman Foundry and Machine Co., Aurora, Ind.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Sturtevant Mill Co., Boston, Mass.

COPPER SULFATE
Tennessee Corp., Atlanta Ga

COTTONSEED PRODUCTS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

DDT
Ashcraft-Wilkinson Co., Atlanta, Ga.
Geigy Agr. Chems., Geigy Chem. Corp., N.Y.C.
Monsanto Chem. Co., St Louis, Mo.

DIAZINON
Geigy Agr. Chems. Geigy Chem. Corp., N.Y.C.

DIELDRIN
Ashcraft-Wilkinson Co., Atlanta, Ga.

DILUENTS
Ashcraft-Wilkinson Co., Atlanta, Ga.

DRUMS—STEEL
Vulcan Containers, Inc., Bellwood, Ill.
Vulcan Steel Container Co., Birmingham, Ala.

DUST CONTROL
Johnson-March, Philadelphia, Pa.

DUST MASKS
Flexo Products, Inc., Westlake, Ohio

ELEVATORS
Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.
Stephens-Adamson Mfg. Co., Aurora, Ill.

EMULSIFIERS
Emulsol Chemical Corp., Chicago, Ill.

ENDRIN
Velsicol Chemical Corp., Chicago, Ill.

ENGINEERS—Chemical and Industrial
Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

FERTILIZER—Liquid
Clover Chemical Co., Pittsburgh, Pa.

FERTILIZER—MIXED
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Davison Chemical Co., div. of W. R. Grace & Co. Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.

FILLERS
Bradley & Baker, N. Y. C.

FISH SCRAP AND OIL
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

FULLER'S EARTH
Ashcraft-Wilkinson Co., Atlanta, Ga.

FUNGICIDES
American Agricultural Chemical Co., N. Y. C.
Roberts Chemicals, Inc., Nitro, W. Va.
Tennessee Corp., Atlanta, a.

GIBBERELLIC ACID
Eli Lilly & Co., Indianapolis, Ind.
Merck & Co., Rahway, N. J.

HEPTACHLOR
Velsicol Chemical Corp., Chicago. Ill.

HERBICIDES
American Cyanamid Co., New York City
American Potash & Chemical Corp., Los Angeles, California
Monsanto Chem. Co., St. Louis. Mo.

HOPPERS & SPOUTS
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

IMPORTERS, EXPORTERS
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Woodward & Dickerson, Inc., Philadelphia, Pa.

KAOLIN
Thomas Alabama Kaolin Co., Baltimore, Md.

INSECT REPELLENT
Glenn Chemical Co., Inc., Chicago, Ill.

INSECTICIDES
American Agricultural Chemical Co., N. Y. C.
American Cyanamid Co., New York City
American Potash & Chemical Corp., Los Angeles California
Ashcraft-Wilkinson Co., Atlanta, Ga.
Geigy Agr. Chems., Div. Geigy Chem. Corp., N. Y. C.
Pennsylvania Salt Mfg. Co., of Wash., Tacoma, Wash.
Velsicol Chemical Corp., Chicago, Ill.

IRON CHELATES
Geigy Agr. Chems., Div. Geigy Chem. Corp., N.Y.C.
Tennessee Corp., Atlanta, Ga.

IRON SULFATE
Tennessee Corp., Atlanta, Ga.

LABORATORY SERVICES
Wisc. Alumni Research Foundation, Madison Wisc.

LEAD ARSENATE
American Agricultural Chemical Co., N.Y.C.

LIMESTONE
American Agricultural Chemical Co., N.Y.C.
Ashcraft-Wilkinson Co., Atlanta, Ga.
National Lime & Stone Co., Finlay, Ohio

MACHINERY—Acid Making and Handling
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Acidulating
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Grinding and Pulverizing
Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Bradley Pulverizer Co., Allentown, Pa.
Gruendler Crusher and Pulverizer Co., St. Louis, Mo.
Poulsen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

Buyers' Guide

MACHINERY—Material Handling
Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Clark Equipt. Co., Construction Mach. Div., Benton Harbor, Mich.
Gruendler Crusher and Pulverizer Co., St. Louis, Mo.
Hough, The Frank G. Co., Libertyville, Ill.
Joy Mfg. Co., Pittsburgh, Pa.
Poulsen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora Ind.
Stephen-Adamson Mfg. Co., Aurora, Ill
Sturtevant Mill Co., Boston, Mass.
Tractomotive Corp., Deerfield, Ill.

MACHINERY—Mixing and Blending
Blue Valley Equipt. Mfg & Eng. Co., Topeka, Kans.
Gruendler Crusher and Pulverizer Co., St. Louis, Mo.
Poulsen Co., Los Angeles, Calif
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Mixing, Screening and Bagging
Poulsen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Power Transmission
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY Superphosphate Manufacturing
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MALATHION
American Cyanamid Co., New York City

MANGANESE SULFATE
Tennessee Corp., Atlanta, Ga.

MANURE SALTS
Potash Co. of America, Washington, D. C.

METHOXYCHLOR
Geigy Agr. Chems., Div. Geigy Chem Corp. N.Y.C.

MINOR ELEMENTS
Geigy Agr. Chems., Div. Geigy Chem. Corp. N.Y.C.
Tennessee Corporation, Atlanta, Ga.

MIXERS
Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Rapids Machinery Co., Marion, Iowa
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

NITRATE OF SODA
Allied Chemical & Dye Corp., Nitrogen Div., N.Y.C.
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NITROGEN SOLUTIONS
Allied Chemical & Dye Corp., Nitrogen Div., N.Y.C.
American Cyanamid Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
Commercial Solvents Corporation. New York City
E. I. duPont de Nemours & Co., Wilmington, Del.
Escambia Chem Corp., Pensacola, Fla.
Mississippi River Chem. Co., St. Louis, Mo.
Phillips Chemical Co., Bartlesville, Okla.
Sinclair Chemicals, Chicago, Ill.
Sohio Chemical Co., Lima, O.
The Texas Co., New York City

NITROGEN MATERIALS—Organic
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

NOZZLES—Spray
Monarch Mfg. Works, Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.

PAILS—STEEL
Vulcan Containers, Inc., Bellwood, Ill.
Vulcan Steel Container Co., Birmingham, Ala.

PARATHION
American Cyanamid Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
Monsanto Chem. Co., St. Louis, Mo.

PHOSPHATE ROCK
American Agricultural Chemical Co., N. Y. C.
American Cyanamid Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Woodward & Dickerson, Inc., Philadelphia, Pa.

PHOSPHORIC ACID
American Agricultural Chemical Co., N. Y. C.
Allied Chemical & Dye Corp., General Chemical Div., N. Y. C.

PLANT CONSTRUCTION—Fertilizer and Acid
Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston Mass.

POTASH—Muriate
American Potash & Chemical Corp., Los Angeles, California
Ashcraft-Wilkinson Co., (Duval Potash) Atlanta, Ga.
H. J. Baker & Bro., N. Y. C.
Bonneville, Ltd., Salt Lake City, Utah
Bradley & Baker, N. Y. C.
Duval Sulphur & Potash Co., Houston, Tex.
International Min. & Chem. Corp., Chicago, Ill.
National Potash Co., N. Y. C.
Potash Co. of America, Washington, D. C.
Southwest Potash Corp., New York City
United States Potash Co., N. Y. C.

POTASH—Sulfate
American Potash & Chemical Corp., Los Angeles, California
International Min. & Chem. Corp., Chicago, Ill.
Potash Co. of America, Washington, D. C.

PRINTING PRESSES—Bag
Schmutz Mfg. Co., Louisville, Ky.

PYROPHYLLITE
Ashcraft-Wilkinson Co., Atlanta, Ga.

REPAIR PARTS AND CASTINGS
Stedman Foundry and Machine Co., Aurora, Ind.

SCALES—Including Automatic Baggers
Exact Weight Scale Co., Columbus, O.
Stedman Foundry and Machine Co., Aurora, Ind.

SCREENS
Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Finco Inc., North Aurora, Ill.
Ludlow-Saylor Wire Cloth Co., St. Louis, Mo.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

SCRUBBERS
Johnson-March, Philadelphia, Pa.

SOLVENTS
Richfield Oil Corp., Los Angeles, Calif.

SHOVEL LOADERS
Clark Equipt. Co., Benton Harbor, Mich.
Hough, The Frank G. Co., Libertyville, Ill.
Tractomotive Corp., Deerfield, Ill.

SLUDGE
H. J. Baker & Bro., New York City

SPRAYS
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.
Baughman Mfg. Co., Jerseyville, Ill.

SPREADERS, TRUCK
Baughman Manufacturing Co., Jerseyville, Ill.

STORAGE TANKS
Cole, R. D., Manufacturing Co., Newnan, Ga.

SULFATE OF AMMONIA
Allied Chemical & Dye Corp., Nitrogen Div., N.Y.C.
American Agricultural Chemcal Co., N. Y. C.
American Cyanamid Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
H. J. Baker & Bro., N. Y. C.
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Phillips Chemical Co., Bartlesville, Okla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFATE OF POTASH—MAGNESIA
International Min. & Chem. Corp., Chicago, Ill.

SULFUR
Ashcraft-Wilkinson Co., Atlanta, Ga.
Texas Gulf Sulphur Co., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFUR—Dusting & Spraying
Ashcraft-Wilkinson Co., Atlanta, Ga.
U. S. Phosphoric Products Div., Tennessee Corp., Tampa, Fla.

SULFURIC ACID
Allied Chemical & Dye Corp. General Chemical Div., N. Y. C.
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Tennessee Corp., Atlanta, Ga.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.

SUPERPHOSPHATE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga
Ashcraft-Wilkinson Co., Atlanta, Ga.
H. J. Baker & Bro., N. Y. C.
Bradley & Baker, N. Y. C.
Davison Chemical Co., div. of W. R. Grace & Co. Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SUPERPHOSPHATE—Concentrated
American Cyanamid Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
H. J. Baker & Bro., N. Y. C.
Bradley & Baker, N. Y. C.
Davison Chemical Co., Div. of W. R. Grace & Co., Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.
Phillips Chemical Co., Bartlesville, Okla.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TALC
Ashcraft-Wilkinson Co., Atlanta, Ga.

TANKAGE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
H. J. Baker & Bro., N. Y. C.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

TANKS—NH3 and Liquid N
Cole, R. D., Manufacturing Co., Newnan, Ga.

TOXAPHENE
Ashcraft-Wilkinson Co., Atlanta, Ga.

TRUCKS—SPREADER
Baughman Mfg. Co., Jerseyville, Ill.

UREA & UREA PRODUCTS
Allied Chemical & Dye Corp., Nitrogen Div., N.Y.C
H. J. Baker & Bro., N. Y. C.
Bradley & Baker, N. Y. C.
E. I. duPont de Nemours & Co., Wilmington, Del.
Grand River Chem. Div., Deere & Co., Tulsa, Okla.
Sohio Chemical Co., Lima, O.

UREA-FORM
E. I. duPont de Nemours & Co., Wilmington, Del.
Nitro-Form Agricultural Chemicals, Woonsocket, R. I.

VALVES
Monarch Mfg. Works, Inc., Philadelphia, Pa.

ZINC SULFATE
Tennessee Corp., Atlanta, Ga.

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